

JPRS-UBB-86-010

23 MAY 1986

19981112 134

# USSR Report

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23 MAY 1986

USSR REPORT  
LIFE SCIENCES  
BIOMEDICAL AND BEHAVIORAL SCIENCES

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## JUVENILE HORMONE ANALOGS SYNTHESIZED

Tallinn IZVESTIYA AKADEMII NAUK ESTONSKOY SSR in Russian Vol 34, No 3, 1985  
pp 176-179

[Article by K. Laats, Malle Schmidt, T. Kaal, A. Kuusik, and T. Valimae, Estonian Academy of Sciences Institute of Chemistry, and Estonian Academy of Sciences Institute of Chemical and Biological Physics: "Synthesis of Juvenile Hormone Analogues. 6. Obtaining Certain Amines Alkylated With 1-Chloro-3-Methyl-5-Alkoxy-2-Pentene, and Their Juvenile Activity"]

[Text] It is well-known that many derivatives of farnesyllic acid and its analogues, substituted geranylphenyl ethers and a number of other compounds, possess juvenile hormone (JH) activity. The majority of them are acid-containing compounds (substituted amides of acids are also active). Among the aromatic amines, some activity is manifested by substituted geranylanilines (for example, ethyl ether of N-geranyl-4-aminobenzoic acid), and also anilines with a peptide side chain (1). Alkoxyalkyl and alkoxyalkenyl anilines are patented as insecticides with JH activity (2). Derivatives of geranylamine have insecticidal and JH properties to a certain degree (3, 4). The patent (5) presents data on the insecticidal properties of sesquiterpenic amines, but it is impossible to say for certain whether they are juvenoids. JH activity has been reported for pyridyl ethers (6). On the whole, however, there is relatively little information on the JH activity of amines.

This report presents data on the JH activity of certain compounds obtained by alkylating p-toluidine, benzylamine, morpholine, and dibutylamine with 1-chloro-3-methyl-5-alkoxy-2-pentene ( $R = \text{iso-C}_3\text{H}_7$  and  $\text{iso-C}_4\text{H}_9$ ) and tested on mealworms (*Tenebrio molitor*).

Alkoxychlorides were obtained by telomerization of isoprene with the corresponding  $\alpha$ -chloroethers (7). Alkylated amines were analyzed using  $^{13}\text{C}$  NMR spectra (see figure). The physical constants and JH activity are presented in the table. Clearly  $\text{LD}_{50}$  for most of the compounds has a value of around 1 mcg/specimen. The activity of compound I is greater than (0.2 mcg/specimen), and for compounds III and VII is lower than (5 and  $>10$  mcg/specimen). It should be noted that along with JH activity, the compounds obtained also manifest insecticidal properties: the death rate of the test subject from toxicosis is fairly significant, especially in the case of compound IV ( $\text{LD}_{50}$  10 mcg/specimen).

Table--Characteristics of Amines Alkylated  
With 1-Chloro-3-Methyl-5-Alkoxy-2-Pentene\*

Номер (1)	Соединение (2)	Вы- ход, % (3)	Т. кип., °C/мм (4)	$d_4^{20}$ (5)	$n_D^{20}$ (6)	Соотно- шение E- и Z- изо- меров (7)	LD <sub>50</sub> , мкг/особь (8)
(7) I	4-Метил-N-(3-метил-5-изопропокси)-2-пентенилфениламин	53	167--170/4	0,9633	1,5010	2,4:1	0,2
(8) II	4-Метил-N-(3-метил-5-изобутокси)-2-пентенилфениламин	51	170--175/3	0,9631	1,5207	1,2:1	1
(9) III	N-(3-метил-5-изопропокси)-2-пентенилбензиламин	71	151--161/4	0,9850	1,5331	1,7:1	5
(10) IV	N-(3-метил-5-изобутокси)-2-пентенилбензиламин	59	164--174/4	0,9485	1,5031	1,1:1	0,9
(11) V	N-(3-метил-5-изопропокси)-2-пентенилморфолин	65	109--112/3	0,9568	1,4681	3,1:1	0,6
(12) VI	N-(3-метил-5-изобутокси)-2-пентенилморфолин	56	122--126/3	0,9423	1,4665	1,3:1	0,8
(13) VII	N-(3-метил-5-изопропокси)-2-пентенилдibuтиламин	57	131--139/3	0,8475	1,4490	2,1:1	>10
(14) VIII	N-(3-метил-5-изобутокси)-2-пентенилдibuтиламин	55	141--149/4	0,8530	1,4501	1,3:1	1

Key:

1. Number
2. Compound
3. Yield, %
4. Boiling point, °C/mm
5. Ratio of E- and Z- isomers
6. LD<sub>50</sub>, mcg/individual
7. 4-methyl-N-(3-methyl-5-isopropoxy)-2-pentenylphenylamine
8. 4-methyl-N-(3-methyl-5-isobutoxy)-2-pentenylphenylamine
9. N-(3-methyl-5-isopropoxy)-2-pentenylbenzylamine
10. N-(3-methyl-5-isobutoxy)-2-pentenylbenzylamine
11. N-(3-methyl-5-isopropoxy)-2-pentenylmorpholine
12. N-(3-methyl-5-isobutoxy)-2-pentenylmorpholine
13. N-(3-methyl-5-isopropoxy)-2-pentenyl dibutylamine
14. N-(3-methyl-5-isobutoxy)-2-pentenyl dibutylamine

\* Commas appearing in numbers in table should be read as decimals.

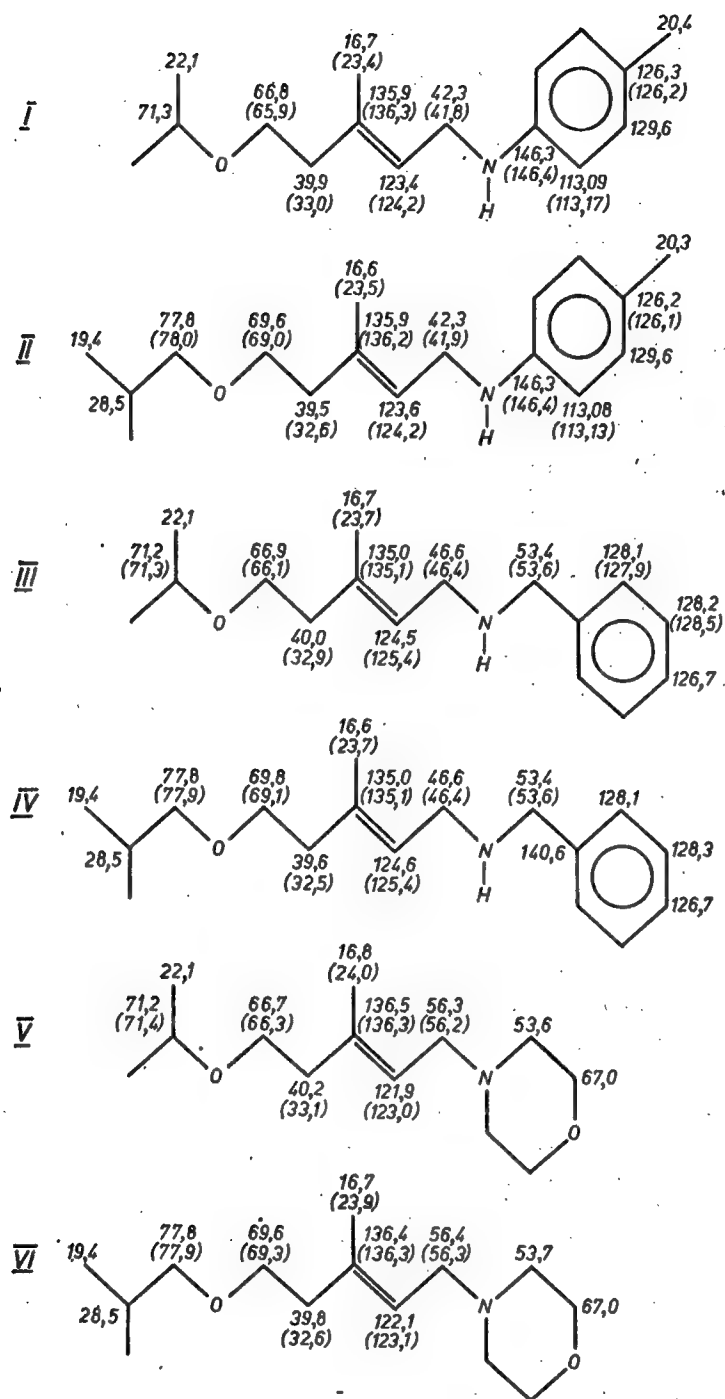


Figure. Chemical shifts of  $^{13}\text{C}$  nuclei from TMS for E-isomers and for Z-isomers (in parentheses), ppm [m.d.]. In the absence of the latter, the shifts in both isomers are identical.

\* Commas appearing in numbers in table should be read as decimals.

## Experimental Part

Telomerization of isoprene with  $\alpha$ -chlorethers was carried out in a solution of hexene in the presence of  $\text{SnCl}_4$  catalyst (7). A three-necked flask with a capacity of 250 milliliters was used to alkylate the amines, fitted with a stirrer, thermometer, and retrograde cooler. The flask was filled with 0.15-0.5 moles of amine (a 5-fold excess of amine was used in the reaction with p-toluidine and benzylamine) and 0.1 mole of alkoxychloride. After the temperature stopped rising due to reaction heat, the flask was heated for an additional 1-2 hours at 80-90 degrees C. To the cooled reaction mixture, 150 ml of a 10 percent solution of NaOH was added, stirring for 0.5 hours. The amine layer was separated and rinsed with water. The aqueous layer was extracted with ether and dried on  $\text{MgSO}_4$ . The ether was distilled, and the product redistilled in a vacuum. Gas-liquid chromatographic analysis was carried out on a Tsvet-6-69A chromatograph, with a flame-ionization detector in a glass capillary column 50 meters long with an internal diameter of 0.25 mm. The liquid phase was tricyanoethoxypropane; the carrier gas was argon. The purity of the products was 93-97 percent. The  $^{13}\text{C}$  NMR spectra were taken on an AM-500 spectrometer from the Bruker Company (FRG) at 125.76 MHz using a proton bypass.  $\text{CDCl}_3$  was used as the solvent and the source of the signal for stabilizing the magnetic field. The internal standard was tetramethyl silane (TMS).

## Conclusions

1. Certain amines alkylated with 1-chloro-3-methyl-5-alkoxy-2-pentene were obtained, and their juvenile hormone activity determined in mealworms.
2. The amines obtained were analyzed using  $^{13}\text{C}$  NMR spectra.

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12255

CSO: 1840/26

UDC 635.21:632.937.16

EFFECTIVENESS OF POTATO VIRUS SUPPRESSION IN APEX CULTURE BY VIRUS INHIBITORS

Moscow DOKLADY VSESOYUZHNOY ORDENA LENINA I ORDENA TRUDOVOGO KRASNOGO ZNAMENI  
AKADEMII SELSKOKHOZYAYSTVENNYKH NAUK IMENI V. I. LENIN in Russian No 10,  
Oct 85 (manuscript received 31 Jan 85) pp 10-12

BORISENKO, S. I., SHMYGLYA, V. A. and SHUSTER, G., Moscow Order of Lenin and  
Order of Labor's Red Banner Agricultural Academy imeni K. A. Timiryazev

[Abstract] Effect of antiviral preparations (AVP) on healing potato plants was studied by the method of apex culture during two stages: while cultivating the plants in the medium and adding the AVP prior to isolation of the explant as well as by transplantation of apices on an analogous medium. Potatoes of the brand Roza and Early Priobskiy were used by infecting them with viruses x, s, y, m. The following AVP were used: novoimanine, alcohol extract of Hypericum perforatum, 2-thiouracil, 2,4-diketohexahydrotriazine, cyanoguanidine and phenylallylthiourea (L-333). The results showed that the use of natural and synthetic AVP lowered the loss of explants and thus aided in development of regenerants. The inhibitory effect of the AVP differed in its specificity against individual viruses, therefore, in each case the AVP activity must be determined against specific viruses. References 11: 3 Russian, 8 Western (1 by Russian author).  
[130-7813/13046]

UDC 633.11"321" + 633.13:631.811

EFFECT OF RETARDANTS ON DEVELOPMENT OF SPRING WHEAT AND OATS AS FUNCTION OF WEATHER CONDITIONS DURING VEGETATION PERIOD

Moscow DOKLADY VSESOYUZHNOY ORDENA LENINA I ORDENA TRUDOVOGO KRASNOGO ZNAMENI  
AKADEMII SELSKOKHOZYAYSTVENNYKH NAUK IMENI V. I. LENIN in Russian No 10,  
Oct 85 pp 40-42

LENTOKHIN, A. M., Perm Agricultural Institute imeni D. N. PRYANISHNIKOV

[Abstract] The goal of this study was to determine the optimal schedule for spraying a resistant brand of spring wheat (Strela) with retardants and to evaluate the effectiveness of preplanting treatment of oat grain (Astor) with

growth regulators under different weather conditions. The experiments were carried out in 1981 (hot and dry year), 1982 (average climate) and in 1983 (excessively wet season). The following retardants were used: chlorocholine chloride (CCC), compazon and dihydrel. The results showed that the spraying of Strela wheat fields with growth regulators was more effective under conditions favoring intensive growth of the plants. In dry climate the spraying had little effect. The best agent for this purpose was CCC. Spraying the oat fields improved the yield under all climatic conditions. Figure 1; references 7: 5 Russian, 2 Western.  
[130-7813/13046]

UDC 631.811:576.8

#### DEVELOPMENT AND APPLICATION OF MICROBIOLOGIC SCREENING METHOD TO RETARDANTS

Moscow DOKLADY VSESOUYUZHNOY ORDENA LENINA I ORDENA TRUDOVOGO KRASNOGO ZNAMENI AKADEMII SELSKOKHOZYAYSTVENNYKH NAUK IMENI V. I. LENIN in Russian No 10,  
Oct 85 pp 46-48

KOKURIN, A. V., All-Union Scientific Research Institute of Applied Molecular Biology and Genetics

[Abstract] Selection of proper screening method for plant growth retardants is a difficult yet important task. A new microbiological method was described for screening growth regulators based on their ability to suppress the biosynthesis of gibberelline. In this method, the test sample is added to a culture of *Gibberella fuzikuroi* and its activity is determined by the drop of the gibberelline level in the culture medium. The method is quite sensitive (tested against chlorocholine chloride it was  $10^{-9}$  M) against most retardants used in agriculture (exceptions are etrel and dihydrel which do not lower the concentration of gibberelline in the culture medium). Two weak points of this method are that it is insensitive to these compounds which do not depress the biosynthesis of gibberelline and it does not work with compounds with fungicidal activity against *G. fuzikuroi*. References 9: 5 Russian, 4 Western (1 by Russian author).  
[130-7813/13046]

## BIOCHEMISTRY

### NEW BIOPOLYMER SEPARATION, ELECTROPHORESIS EQUIPMENT REPORTED

Moscow KHIMIYA I ZHIZN in Russian No 9, Sep 85

[Untitled, unattributed article under rubric "New Methods, New Instruments"]

[Text] Isoelectric focusing (IEF) is an effective new method that makes it possible to separate out complex mixtures of biopolymers (see KHIMIYA I ZHIZN No 11, 1981, p 3). It is used in biochemistry, molecular biology, genetics and biotechnology. Until now the extensive use of this method has been hampered in our country because of the lack of readily accessible equipment. An instrument, the IEF-50-500, has been developed at a special design bureau for biophysics equipment (the Special Design Bureau for Biophysics Equipment, 125015, Moscow, Butyrskaya ulitsa, 76) and is designed for isoelectric focusing (in columns of two standard sizes). It is planned to start producing it this year at the Biofizika Production Association (290049, Lvov, ulitsa Chapayeva, 9). At the same enterprise production is being started of a set of instruments (a laboratory) developed at the Special Design Bureau for Biophysics Equipment for doing gel electrophoresis. This is the LGE-2, which includes a complete set of devices and attachments for doing electrophoresis in gel columns and on gel plates (separation chambers and gel carriers, thermostats and so forth).

Standardized power sources with stabilized output parameters have been developed at the Special Design Bureau for Biophysics Equipment; they can be used for virtually all kinds of electrophoresis. The power sources--the IPE-600-0.5, IPE-2000-0.2 and IPE-5000-0.1--with output voltages from 30V to 5,000V, load current 10mA to 500mA and power 0.5W to 400W, are being produced by the Mukachevo Complete Laboratory Plant (295400, Mukachevo, Zakarpatskaya oblast, ulitsa Pionerov, 78).

Orders for these instruments should be sent to the above addresses or to the supply administrations of these departments.

9642

CSO:1840/121

## ADSORPTION IMMOBILIZATION OF COENZYME-DEPENDENT OXIDOREDUCTASES: FUNCTION IN ELECTROENZYME PROCESSES AND AS BIOMEMBRANE MODEL

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 19, No 3, May-Jun 85  
(manuscript received 7 Jul 83; in final form 13 Mar 84) pp 662-670

SHAPOVALOV, Yu. A. and GLADYSHEV, P. P., Institute of Chemical Sciences,  
Kazakh SSR Academy of Sciences, Alma-Ata

[Abstract] Various forms of carbon support material were utilized for the immobilization of alcohol dehydrogenase (ADH) and NAD, in order to study the function of such systems in electroenzyme processes and to assess them as a model of biological membranes. The advantage of the carbon-based materials is that carbon serves as a conductor, a useful property in studies on oxidoreductases. Adsorption of both the enzyme and the cofactor was found to be primarily hydrophobic in the case of oxidized carbon, charcoal, and aminated carbochrome in phosphate, pyrophosphate, and carbonate buffers. Studies with carbon materials coated with unsaturated fatty acids resulted in an adsorbent that preferentially bound NAD first, followed by ADH binding, and formed a liquid monolayer simulating biological membranes. Mathematical analysis of the system revealed that NAD was located in the catalytic cleft of the enzyme molecules, and was held in place by the carbon electrode surface forces. The net orientation of the ADH molecules vis-a-vis one another and NAD was such that the fluctuation of NAD from the hydrogenated (NADH) state to  $\text{NAD}^+$  could function in the transfer of hydrogens across membranes, thereby simulating an internal mitochondrial membrane. Figures 6; references 31: 19 Russian, 12 Western.  
[124-12172/13046]

NOVEL PRINCIPLES OF INSECT FLIGHT

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 283, No 6, Aug 85  
(manuscript received 25 Mar 85) pp 1491-1495

BRODSKIY, A. K., Leningrad State University imeni A. A. Zhdanov

[Abstract] The array model of vortex rings was employed in an analysis of insect flight to determine the relationship between the size of the rings and swing frequency. In insects with rapidly beating wings apical vortex rings predominate in creating the aerodynamic forces for sustained flight, unlike the case in insects with relatively slow wing movement. The former represents a novel evolutionary development, since it allows for independent function of the right and left wings and significantly improves maneuverability. The wings may function in-phase or out-of-phase, or one or the other may be excluded from flight motion temporarily. Figures 1; references 8: 3 Russian, 5 Western.  
[86-12172/13046]

TEMPERATURE DEPENDENCE OF INTERACTION OF  $\alpha$ -LATROTOXIN WITH BILAYER  
PHOSPHOLIPID MEMBRANES

Kiev DOKLADY AKADEMII NAUK UKRAINSKOY SSR, SERIYA B: GEOLOGICHESKIYE,  
KHIMICHESKIYE I BIOLOGICHESKIYE NAUKI in Russian No 9, Sep 85 (manuscript  
received 15 May 85) pp 82-85

[Article by A. N. Chanturiya, Yu. V. Sokolov, E. I. Grebinozhko, A. N.  
Nikolayenko, A. P. Ivanov and V. K. Lishko, Institute of Biochemistry,  
UkSSR Academy of Sciences, Kiev]

[Text] The use of model systems for investigating biological membranes permits the obtaining of important information about the functional mechanisms of various membrane structures and, in particular, of those proteins which effect the selective transport of ions. Among the models of ion channels, gramicidine A and polyene antibiotics (1-3) have been the most studied.

However, the majority of studied channel formers are selective only with respect to univalent cations. The proteins exhibiting selectivity toward divalent cations, including the calcium channels, have been studied insufficiently. Apparently, this is explained by the difficulties that researchers have encountered in the attempt to isolate calcium channels in the purified state. The missing data about the nature and functional mechanisms of calcium channels may be obtained through studying their approximate models. Such a model is the channel former  $\alpha$ -latrotoxin, isolated from venom of the karakurt [a black widow spider subspecies] (4). Investigation of the properties of ion channels formed by this toxin has shown that they are similar to properties of the calcium channel in excitable membranes (5).

Furthermore, the process of this toxin's incorporation into a lipid bilayer may be used for more detailed study of the lipid-protein interaction. We have studied the dependence of toxin incorporation into a bilayer phospholipid membrane (BLM) upon the membrane's phase state, which changed depending upon the concentration of cholesterol and the temperature.

With water, we eluted whole poison out of glands removed from adult females of the karakurt (*Latrodectus mactans tredecimguttatus*) and preserved it at  $-70^{\circ}\text{C}$ , thawing it immediately before isolation of  $\alpha$ -latrotoxin.

We isolated  $\alpha$ -latrotoxin from the whole poison using the FPLC [flash performance liquid chromatography] chromatograph of the Pharmacia firm (Sweden) on a mono-Q column. As eluting agent [solvent], we used a 0.02 mol/dm<sup>3</sup> tris-HCl buffer, pH 8.05, with a sodium chloride concentration gradient. Peak  $\alpha$ -latrotoxin was eluted from the column at an NaCl concentration of 0.33 mol/dm<sup>3</sup>. A homogeneous protein with molecular weight 130 kD [130,000 units] was obtained after rechromatography. In determining toxicity in mice, it turned out that the protein's LD<sub>50</sub> [50 percent lethal dose] was equal to 20 micrograms per kilogram of mouse weight, which coincides with the data of (6).

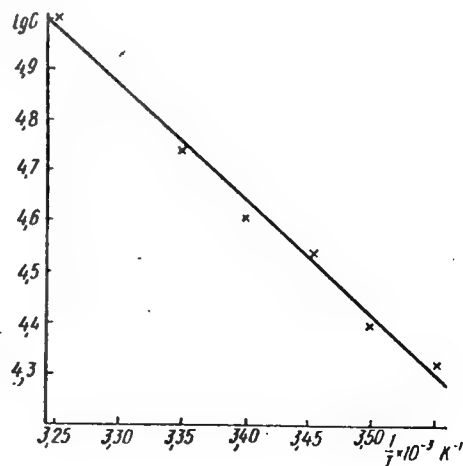
We formed the BLM according to the method of (7), on an opening of 0.6 mm diameter in a teflon beaker, from the solution of a mixture of phosphatidyl choline (PC) and cholesterol (C) in n-heptane in various proportions. The concentration of PC and C in the mixture constituted 20 mg/cm<sup>3</sup>. We obtained the phosphatidyl choline from egg yolks by the method of (8), and we used the cholesterol of the Serva firm (Federal Republic of Germany).

We conducted electrical measurements according to the outline of (9). For maintaining and changing the temperature, we enclosed the small hole containing the BLM in a metal housing, on the exterior side of which we fastened TEMO-3 semiconductor batteries. We recorded the temperature by an electronic thermometer with a minute, low-inertia sensing element, which was located in the solution surrounding the membrane. We provided for temperature constancy throughout the solution with a continuously functioning magnetic agitator.

We conducted all experiments in a solution containing 10 mmol CaCl<sub>2</sub> and 10 mmol tris-HCl, pH 7.4. We introduced  $\alpha$ -latrotoxin into the solution from the cis-side of the membrane, in a concentration of 10<sup>-9</sup> mol/dm<sup>3</sup>. We removed the toxin, not incorporated into the membrane, by means of perfusion (10).

The temperature dependence of permeability of the channel formed in the BLM by  $\alpha$ -latrotoxin is shown in figure 1. As we see, the permeability of the channel increases with increase in the temperature. This agrees with data of the authors of (11), who investigated calcium transport in neurosecretory cells treated with  $\alpha$ -latrotoxin.

Fig. 1. Temperature dependence of the permeability of a BLM modified by  $\alpha$ -latrotoxin.  
BLM composition: PC:C = 2:1





The magnitude of  $Q_{10}$  obtained for this dependence in the investigated temperature range is equal to 2.0-2.3, which correlates well with the magnitude of  $Q_{10}$  for the calcium channel of excitable membranes (12).

We investigated temperature dependence at a voltage of +100 mV on the BLM; that is, in the range at which the channels are constantly open (5). At this voltage, as well as at other positive voltage values, transitions of channels into the closed condition were not observed, which gives evidence of the absence of temperature effect upon a channel's kinetic parameters. The shapes of the volt-ampere curves of a membrane modified by  $\alpha$ -latrotoxin (figure 2) also give evidence of this. At the same time, the change in permeability with negative voltage values on the membrane may be explained not only by the channel's permeability, but also by a change in the kinetics of transitions from the open condition to the closed, which is observed at voltages from -40 to -100 mV (5). However, in consequence of the fact that the lifetime of the latrotoxin channel is rather long in both the open and the closed condition, obtaining a sufficient number of individual events for subsequent statistical processing was rendered difficult.

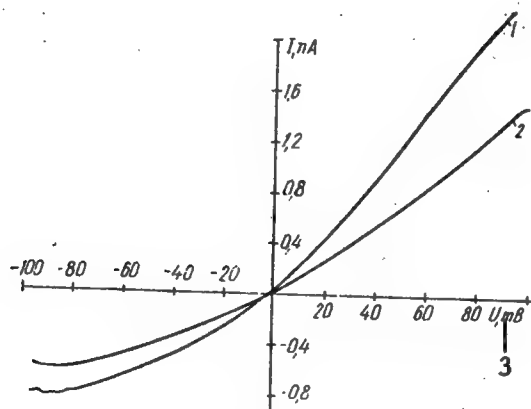


Fig. 2. Volt-ampere characteristics [curves] for a BLM modified by  $\alpha$ -latrotoxin. BLM composition: PC:C = 2:1.  
1. 20°C      2. 4.5°C      3. V in mV

No noticeable changes in the permeability of single channels and their kinetic characteristics were observed with change in the ratio of phosphatidyl choline and cholesterol in the BLM. Evidently, the bilayer's phase state, which changes depending upon the cholesterol content, affects the channel's parameters, which, apparently, change in consequence of the direct effect of temperature upon the  $\alpha$ -latrotoxin molecule's conformation.

We also noted the effect of the membrane's composition upon the binding of the toxin to it. At the ratio PC:C = 2:1 (by weight),  $\alpha$ -latrotoxin's incorporation into the BLM is irreversible. Upon perfusion of the section in which

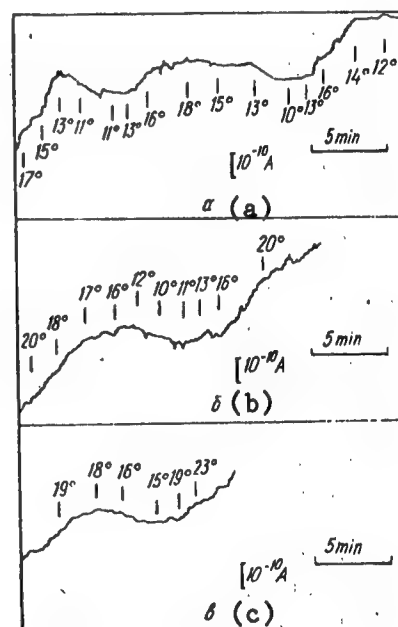
the toxin was held with a solution of the same ionic composition, but without  $\alpha$ -latrotoxin, the rate of increase in the permeability of membranes was slowed, with its subsequent stabilization at a certain level; that is, the channels bound to the BLM did not come out of it into the solution. At other ratios of PC:C (1:1 and 1:2) under similar conditions, permeability of the BLM was reduced in the perfusion process.

Moreover, we investigated the temperature dependence of the process of  $\alpha$ -latrotoxin's incorporation into the BLM (figure 3). As we see, for each ratio of PC:C there exists a certain threshold temperature, below which incorporation of channels into the BLM does not occur. Apparently, incorporation of the toxin into the phospholipid bilayer is facilitated with increase in the latter's fluidity. The process of  $\alpha$ -latrotoxin's incorporation into the BLM is accelerated with increase in temperature.

Fig. 3. Effect of temperature upon change of BLM permeability in the presence of  $\alpha$ -latrotoxin.

BLM composition:

- a. PC:C = 2:1
- b. PC:C = 1:1
- c. PC:C = 1:2



It has been shown by us previously (5) that  $\alpha$ -latrotoxin is incorporated into the BLM only with the presence in the solution of 1-2 mol/dm<sup>3</sup> Ca<sup>2+</sup> or 20-30 mol/dm<sup>3</sup> of univalent cations. It is well known (13) that Ca<sup>2+</sup>, in being bound to the phospholipid bilayer, increases the value of its phase-transition point from the crystalline state to the liquid-crystalline. In our research,  $\alpha$ -latrotoxin's incorporation into the phospholipid bilayer was stimulated by increase in temperature. This is explained by the fact that the mechanisms for introduction of the toxin into the BLM by means of Ca<sup>2+</sup> and increase of temperature are different. In the first case, apparently, direct interaction of  $\alpha$ -latrotoxin with Ca<sup>2+</sup> takes place, a consequence of which is change in conformation of the toxin molecule, which makes possible its incorporation into the BLM. In the second case, evidently, the primary role belongs to the phase state of the bilayer, increasing the fluidity of which promotes the introduction of the toxin molecules into it.

Thus, the change in the latrotoxin channel's transport properties dependent upon temperature is explained by the temperature's effect directly upon the  $\alpha$ -latrotoxin molecule, while the temperature dependency of the toxin's inclusion in the BLM is provided for by the bilayer's phase state.

SUMMARY. Incorporation of  $\alpha$ -latrotoxin into the bilayer phospholipid membrane is investigated. It is shown that definite temperature exists for all the investigated membrane compositions below which incorporation does not occur. The value of  $Q_{10}$  for the latrotoxin channel correlates well with that for the calcium channel of excitable membranes. [This summary, provided by the source in English, is stated exactly as provided.]

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CSO: 1840/085

UDC 547.995.17:616.462.015.2

PROBLEMS OF CREATION OF BIOSPECIFIC SYNTHETIC POLYMERS FOR CONTACT WITH BIOLOGICAL MEDIA

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IMENI D. I. MENDELEYEVA  
in Russian Vol 30, No 4, Jul-Aug 85, pp 402-410

PLATE, N. A., corresponding member, USSR Academy of Sciences, Professor, Chemistry Faculty, Moscow State University imeni M. V. Lomonosov, Director, Institute of Petrochemical Synthesis imeni A. V. Topchiyev, USSR Academy of Sciences, and VALUYEV, L. I., doctor of chemical sciences, Department of Chemistry, Moscow State University imeni M. V. Lomonosov

[Abstract] One promising approach to regulating the interaction of synthetic polymers with biological media and tissues is to give the polymers biospecific properties, that is, the capability to interact with only one or a few components of the complex biological environment. Biospecific or affinity chromatography is based on the ability of proteins, polypeptides and other biologically-active compounds to interact with certain biospecific ligands selectively and reversibly. This article discusses the need to develop a new approach to chemical modification of synthetic polymers with biospecific ligands through activation of the ligands themselves by introduction to them of functional groups which can interact with most polymer materials, including those which are chemically inert. The results indicate the great promise of the use of biospecific synthetic polymers to solve a number of urgent problems in the chemistry of medical-use polymers. The possibility has been demonstrated, in principle, of solving the problem of creating polymers of this type and the theoretical prerequisites have been determined for the synthesis of biospecific polymers and their functioning in contact with biological media, including living tissue. Figures 6; references 32: 24 Russian, 8 Western.

[043-6508/13046]

## CRITICAL LEVELS OF LONG-TERM GLOBAL RACEMIZING FACTORS ON BIOSPHERE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 283, No 6, Aug 85  
(manuscript received 11 Feb 85) pp 1485-1488

AVETISOV, V. A., ANIKIN, S. A., GOLDANSKIY, V. I., academician, and  
KUZMIN V. V., Institute of Chemical Physics, USSR Academy of Sciences,  
Moscow

[Abstract] A theoretical analysis was conducted of the effects of disbalance in the chiral purity of the biosphere under the influence of long-term global racemizing factors. One of the major catastrophic consequences of such eventuality can be the extinction of life and reversion of the globe to a prebiotic state. The mathematical considerations were based on a model system that envisaged the biosphere as consisting of two mutually interdependent subsystems designated R and A. System R insures the genesis of chiral substances at the expense of achiral substances and energy. One of the components of system R is the plant kingdom which produces chiral material via photosynthesis. System A is made up of units utilizing chiral substances for reproduction. While utilization by units of system A of one of the antipodal forms of the chiral substrate results in reproduction, the utilization of the other antipodal form leads to death and transfer of the units into system R in the form of a racemate. The effects of anthropogenic and other factors on system A are basically insignificant, but their effects on system R can be catastrophic as they may deprive the globe of chiral substrates needed by living nature. Figures 2; references 11: 3 Russian, 8 Western.  
[86-12172/13046]

UDC 547.96+513.83

## DERIVATION OF SPATIAL CONSIDERATIONS UNDERLYING ANTIPARALLEL BETA-STRUCTURE IN GLOBULAR PROTEINS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 283, No 6, Aug 85  
(manuscript received 26 Feb 85) pp 1500-1503

CHIRGADZE, Yu. N., Protein Institute, USSR Academy of Sciences, Pushchino,  
Moscow Oblast

[Abstract] An analysis was conducted on primary chain disposition in relation to beta-pleated antiparallel structure in 15 globular proteins. The analysis demonstrated that the spatial prerequisites can be classified into three basic categories, described as prerequisite beta: one extended polypeptide chain, prerequisite m: two extended segments in one pleat, and prerequisite g: four segments in one or two pleats. Furthermore, in the latter case (e.g., g), differentiation exists between a g<sup>+</sup> and a g<sup>-</sup> state on the basis of the direction of the polypeptide chain. It is demonstrated

that on the basis of this classification all possible topological combinations can be assured by utilization of the three basic types of prerequisites. These structural prerequisites appear to constitute a satisfactory foundation for planning the spatial structure of newly synthesized or 'artificial' proteins. Figures 3; references 14: 2 Russian, 12 Western.

[86-12172/13046]

UDC 616.98:578.8]-092:612.017.1]-07

ISOLATION OF HYBRIDS OF SOMATIC CELLS BY SPECIFIC INTERFERON-VIRUS  
SELECTION METHOD

Moscow VOPROSY VIRUSOLOGII in Russian No 2, Mar-Apr 85 (manuscript  
received 20 Apr 84) pp 244-250

NAROVLYANSKIY, A. N., AMCHENKOVA, A. M., SHCHEGLOVITOVA, O. N. and KHESIN,  
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imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow

[Abstract] The method of hybridization of somatic cells allows mapping of the genes of sense cell receptors to viruses and genes related to the formation and action of human interferon, permitting researchers to approach an explanation of the mechanisms of specific and nonspecific defense of cell populations from viral infection. The production and selection of hybrid cells, particularly directed selection of hybrid cells with certain human chromosomes, is an important aspect of this problem. The present work describes a method of specific selection of hybrid cells using successive treatment of interferon-sensitive cells with species-specific interferon and cytotoxic virus. The mixture of cells produced in the method consists of parent cells and two groups of polynuclear cells, including heterokaryons, hybrid cells containing nuclei of both parent species. Selective isolation and reproduction of the hybrid cells requires the death of all other types of cells. The use of the interferon-virus method of selection of hybrid cells achieves this, specifically isolating hybrids with human chromosomes, the genes of which are related to the sensitivity of the cells to various types of interferon, including  $\gamma$  interferon, the chromosomal localization of the gene of which has not been determined. Figures 6; references 23: 11 Russian, 12 Western.

[019-6508/13046]



## AUTOMATIC FOAM-QUENCHING SYSTEM

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 19, No 9, Sep 85  
(manuscript received 26 Jun 84) pp 1141-1144

SKARGA, V. N., TIKHOMIROV, V. K., KOLOBOV, A. N. and VAKAL, B. K.

[Abstract] Regulation of foam-formation is an important problem in production of vitamins, antibiotics, enzymes, amino acids and vaccines. Technical details are provided for an automated foam-quenching system, based essentially on an electric-contact sensor for detection of foam level. The basic approach consisted of utilization of electric signal regulator ERSU-3 complemented with sensors of requisite sensitivity. The latter employed a sensor constructed from 1Kh18N9T steel consisting of electrodes with a surface area of  $10^{-4} \text{ m}^2$  each and an interelectrode distance of 0.02 m, with an electrical resistance of  $10^6 \text{ ohm}$ , taking into consideration foam conductivity of  $0.6 \times 10^{-6} \text{ ohm/m}$  at 50 Hz. The entire installation was tested under actual process conditions, showing that it operated with an accuracy of  $\pm 5\%$  and required 30% less time for the preparation of the quenching agent. Figures 4; references 9: 6 Russian, 3 Western.

[143-12172/13046]

UDC 551.464.546.221:591.524.112:595.34(262.5)

TOXICITY OF BLACK SEA DEEP WATER TO BENTHIC AMPHIPODS GAMMARUS OLIVII

Kiev DOKLADY AKADEMII NAUK UKRAINSKOY SSR, SERIYA B: GEOLOGICHESKIYE, KHIMICHESKIYE BIOLOGICHESKIYE NAUKI in Russian No 8, Aug 85 pp 74-76

[Article by G. G. Polikarpov, V. G. Tsytsugina, corresponding member, USSR Academy of Sciences, V. I. Timoshchuk, N. V. Demina and N. N. Tereshchenko]

[Text] Because of hydrogen sulfide toxicity, the deep waters of the Black Sea are populated only by anaerobic bacteria [1]. In comparison with the surface waters, they are also enriched in the biogenous elements (nitrogen, phosphates, silicates) and differ with respect to a number of other hydrochemical indices, having in particular an elevated concentration of the major ions and trace elements, especially manganese [2].

This report gives the results of a determination of the toxicity of Black Sea deep water containing normal and decreased amounts of hydrogen sulfide.

The experimental subject used was *Gammarus olivii*, a widespread benthic species with an important ecological role, having great nutritional significance [3], which is easily grown under laboratory conditions.

Water was collected using a bathometer at depths of 1,000, 1,500 and 2,080 m, and air was bubbled through it to remove the hydrogen sulfide. The following data were obtained:

Concentration, mg H <sub>2</sub> S/l sea water	12.4	10.1	7.1	3.4	1.5	0.6
Water	Natural			Bubbled		

For our control experiments water was collected from the sea surface. Before the experiments were begun, the amphipods were adapted to laboratory conditions for a week's time.

The experiments were conducted in one-liter glass aquaria and lasted three full days. Fifteen amphipods were used in each of the control and experimental groups.

Survival of the animals served as the index of toxicity. The LC<sub>50</sub> of hydrogen sulfide, or the concentration at which 50 percent died, was determined graphically [4].

The study was performed during the October 1984 Black Sea expedition of the NIS [expansion unknown, possibly Scientific Research Vessel?] "Professor Vodyanitskiy." The results obtained are shown in the table. It can be seen that deep waters whose hydrogen sulfide concentration has been decreased by bubbling air through them (to 0.6 and 1.5 mg/l) do not cause any amphipods to die. Higher H<sub>2</sub>S concentrations decreased the survival rate of the amphipods.

#### Survival Rate of Amphipods as a Function of Hydrogen Sulfide Concentration

<u>H<sub>2</sub>S Concentration, mg/l</u>	<u>Percent of Individual Dead (No Control)</u>		
	<u>24 hours</u>	<u>48 hours</u>	<u>72 hours</u>
0.6	0	0	0
1.5	0	0	0
3.4	0	6	47
7.1	20	20	--
10.1	26	26	53
12.4	80	80	87

The mortality of the animals, (in units of 10 percent) as a function of the hydrogen sulfide concentration in the water during two days they spent in the aquaria is shown by graph [not reproduced]. The 48-hour LC<sub>50</sub> is equal to 11 mg H<sub>2</sub>S/l of sea water. By day three of the experiment, the toxic effect had increased (see the table); and the LC<sub>50</sub> decreased. This may be explained as being due to the accumulation of the toxic dose because of the residual hydrogen sulfide in the water, as well as due to the progress of the pathological process caused by the action of the initial concentration of the toxicant.

According to data in the literature [5-7], different species of fish and invertebrates differ significantly in their sensitivity to hydrogen sulfide contamination. The toxic concentrations of hydrogen sulfide range from 1 to 50 mg/l for different species, and the duration of exposure required ranges from several hours to several days or even weeks. *G. olivii*, our experimental subject, is one of the most highly sensitive species. Judging from the criterion of survival, the toxic concentration of H<sub>2</sub>S for these amphipods in short-term experiments is just over 1.5 mg/l.

Thus, in deep waters, hydrogen sulfide concentrations of more than 1.5 mg/l have a toxic effect.

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9832/13046

CSO: 1840/069

UDC 616.98:578.832.1]-022.3-07

CIRCULATION OF INFLUENZA VIRUS IN POULTRY FARMS

Moscow VOPROSY VIRUSOLOGII in Russian No 3, May-Jun 85 (manuscript received 29 Jun 84) pp 308-310

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[Abstract] A comparative study is presented of the presence of anti-influenza antibodies in chickens at a large poultry farm and in personnel working at the farm. Studies were performed in May of 1982 through April of 1984, including two periods of influenza epidemic. The epizootic situation at the farm was favorable throughout the entire period of the study. The studies indicate that antibodies were present primarily for the same antigen variants of the human influenza virus in the chickens and the personnel working with them. This indicates that the epidemic strains of influenza virus could be introduced to the population of domestic birds by persons with access to them. Development of the epizootic process is facilitated by the great concentration of birds in modern poultry complexes and the rapid sequence of generations. It is possible that long-term independent circulation, in the animal reservoir, of influenza pathogens may represent a potential danger for the human population. References 9: 6 Russian, 3 Western.  
[021-6508/13046]

## ISOLATION OF KARELIAN FEVER PATHOGEN FROM AEDES SP. MOSQUITOES

Moscow VOPROSY VIRUSOLOGII in Russian No 3, May-Jun 85 (manuscript received 15 Jun 84) pp 311-313

LVOV, D. K., SKVORTSOVA, T. M., GROMASHEVSKIY, V. L., VEREZINA, L. K., YAKOVLEV, V. I., GUSHCHIN, B. V., ARISTOVA, V. A., SIDOROVA, G. A., GUSHCHINA, Ye. A., KLIMENKO, S. M., LVOV, S. D., KHUTORETSKAYA, N. V., MYASNIKOVA, I. A. and KHIZHNYAKOVA, T. M., Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow

[Abstract] In 1981, there were outbreaks in Finnoscanidia of disease called Pogost Disease in Finland, Karelian Fever in the USSR, and Okelbo Disease in Sweden. The pathogen was found to be a member of the sindbis antigen complex (genus Alphavirus Togaviridae). During 1983, work was conducted on isolation of the pathogen of this disease both from persons suspected of having Karelian fever and from natural sources. This report discusses isolation of strains of Alphavirus from Aedes Sp. mosquitoes collected in a Karelian fever focus in July-August of 1983 near the village of Muyezerkiy (64°N, 32°E). The virus isolated, LEIV-9298 Karelia, is biologically more active upon interaction with chick-embryo culture, and may be a new representative of the sindbis-ZEL antigen complex. Figures 1; references 3: 1 Russian, 2 Western. [021-6508/13046]

## DETECTION OF HEPATITIS B VIRAL MARKERS (HBsAg AND ANTI-HBs) AMONG MEDICAL PERSONNEL

Moscow VOPROSY VIRUSOLOGII in Russian No 3, May-Jun 85 (manuscript received 17 Jul 84) pp 327-330

IVANOVA, M. Yu., ASRATYAN, A. A., ARAKELOV, S. A., MIKHAYLOV, M. I., ANANYEV, V. A. and VASILYEVA, V. I., Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences; Institute of Virology imeni D. I. Ivanovskiy, USSR AMS, Moscow

[Abstract] The purpose of this work was to determine the frequency of HBsAg and anti-HBs markers among medical personnel of various occupations as an indication of their frequency of infection with hepatitis B. The serum of 370 medical workers from Moscow and 140 from Kzyl-Orda, Kazakh SSR, was studied. Blood donors of the same age and sex were used as a control group. The immunoenzyme assay method was found to be the most sensitive method tested, allowing the number of positive results to be increased by a factor of 1.2-1.9 in comparison to the indirect hemagglutination reaction and more than five times in comparison to the immunoelectrophoretic method. HBsAg was found in 2.7% of Moscow area medical personnel, 1.5% in the control group. In Kzyl-Orda, the figures were 10.7 and 8%. Similar results were obtained

for anti-HBs: 18.4% among medical workers in Moscow, 10.5% in the control. HBsAg was found in 4.1% of physicians, 2.3% of nurses, 2.1% of orderlies. Anti-HBs was found most frequently among laboratory workers (30.8%) and physicians (21.5%). The figures for orderlies and nurses were 11.8 and 14.3%, respectively. Medical workers must therefore be considered to be in a high risk group for hepatitis B. Figures 2; references 13: 5 Russian, 8 Western.

[021-6508/13046]

UDC 615.371:578.891].015.46.07

STUDY OF IMMUNOLOGIC AND EPIDEMIOLOGIC EFFECTIVENESS OF HEVAC VACCINE  
AGAINST HEPATITIS B IN HIGH RISK GROUP

Moscow VOPROSY VIRUSOLOGII in Russian No 3, May-Jun 85 (manuscript received 26 Jun 84) pp 330-333

KHUKHLOVICH, P. A., VYAZOV, S. O., SHAKHGILDYAN, I. V., ANANYEV, V. A., BRAGINSKIY, D. M., YERMOLENKO, V. M., SYCHEV, A. V. and LVOV, D. K.,  
Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow

[Abstract] The Pasteur Institute in France has begun commercial manufacture of the HEVAC B vaccine against hepatitis B. This article presents results of the first controlled epidemiologic experiment testing the HEVAC B vaccine in the Soviet Union. The purpose of the work was to determine the immunologic and epidemiologic effectiveness of the vaccine as well as the rate of reactions among a high risk group, medical personnel in Moscow in contact with blood and blood preparation. A study of 215 persons 30 days after administration of the vaccine revealed anti-HBs in 78 (36.3%). One month after repeated immunization, the frequency of anti-HBs decreased to 77.2%. Thirty days after administration of the vaccine for the fifth time, seroconversion was observed in 89.5% of vaccinated subjects, six months after the first vaccination--in 93.9%. Observation of a control group six months after the beginning of the experiment showed an antibody frequency of only 2.6%. Ninety-three and nine-tenths percent of the persons receiving HEVAC B showed indications of development of humoral postvaccine immunity. The vaccine was not highly reactogenic, the frequency of side reactions being greatest (32.3%) in first immunization, subsequently decreasing to 23.3% and 10.9% after second and third administrations, the reactions being local and occurring primarily within the first 24 to 48 hours. No postvaccinal complications were observed. Figures 2; references 15: 7 Russian, 8 Western.

[021-6508/13046]

DETECTION OF NATURAL FOCI OF HEMORRHAGIC FEVER WITH RENAL SYNDROME IN  
KOMI ASSR

Moscow VOPROSY VIRUSOLOGII in Russian No 3, May-Jun 85 (manuscript received  
4 Jun 84) pp 354-357

MYASNIKOV, Yu. A., RYLTSEVA, Ye. V., TKACHENKO, Ye. A., IVANOV, A. P.,  
DZAGUROVA, T. K., REZAPKIN, G. V., FADEYEV, Ye. Ye., FARSHATOV, A. G. and  
SAFONOVA, N. M., Institute of Poliomyelitis and Viral Encephalitides,  
USSR Academy of Medical Sciences, Moscow; Republic Sanitary-Epidemiologic  
Station, Komi ASSR, Syktyvkar.

[Abstract] Studies were performed in three directions, including catching  
and examination of small mammals for the presence of HFRS virus antibodies  
in lung tissue, determination of antibodies to HFRS virus in blood serum of  
the rural population, and serologic examination of persons who have had  
diseases similar to HFRS. HFRS antigen was detected in the lung tissue of  
voles in three of five regions studies. Active natural HFRS foci were found  
near the village of Obyachevo and near Malaya Sluda. Some 5.2% of the  
population was found to have immunity to the disease, significantly greater  
than in the central RSFSR. The lack of any previously reported cases of  
HFRS in the Komi ASSR is considered now to be probably due to unfamiliarity  
of physicians in the area with the disease. References 7 (Russian).  
[021-6508/13046]

UDC 616.98.578.832.1]-036.2'1978-1982'

SPECIFICS OF INFLUENZA A. EPIDEMIC PROCESS IN 1978-1982

Moscow VOPROSY VIRUSOLOGII in Russian No 3, May-Jun 85 (manuscript received  
27 Apr 84) pp 364-366

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[Abstract] In 1977, a variety of influenza A (H1N1) isolated in 1957 from  
the human population appeared once again and caused several outbreaks and  
epidemics. Circulation of this variety continued the next year. This  
article is intended to determine how the influence of the age of the (H1N1)  
variety influenced propagation of influenza A (H3N2). Results of examination  
of over 200,000 patients in 1978-1982 were used. Some individual periods of  
predominance of one of the varieties were observed, most frequently A (H1N1),  
usually related to the appearance of a new antigenic serovariant which  
squeezed out the preceding variant of the same variety. Restoration of the  
A (H1N1) variety in 1977 did not result in complete elimination of the  
dominant A (H3N2) and was not even accompanied by clearly expressed competi-  
tion. Epidemic processes caused by either variety continued to develop in  
parallel and independently. Figures 1; references 4 (Russian).  
[021-6508/13046]



ANALYSIS OF INFLUENZA SITUATIONS IN USSR AND EAST GERMANY DURING NONEPIDEMIC (1978-1979) AND EPIDEMIC (1979-1980) SEASONS

Moscow VOPROSY VIRUSOLOGII in Russian No 2, Mar-Apr 85 (manuscript received 27 Apr 84) pp 150-153

YAKHNO, M. A., MOLIBOG, Ye. V., ANTONOVA, I. V., SHARFENORT, Kh. GERIKE, E. and ZAKSTELSKAYA, L. Ya., Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow; Institute of Applied Virology, GDR Ministry of Health, Berlin [East Germany]

[Abstract] The system of influenza observation allows changes in the variability of the virus circulating in the world from season to season to be traced, as well as variations within a single epidemic season in various countries. Cooperation between the Regional Influenza Center of the USSR and the National Influenza Center of East Germany has permitted such an analysis, and this article presents the results of influenza observation in 1978-1979 and 1979-1980. During both seasons, influenza morbidity in the USSR increased earlier in the season than in East Germany. During 1978-1979, the two areas had different strains, whereas in 1979-1980 the epidemic resulted from a new drift variant of A(H3N2), though the strains were biologically dissimilar in the two nations. The study indicates the need for surveillance in various nations of the world in order to determine the characteristics of the spread of influenza. References 5: 4 Russian, 1 Western.

[019-6508/13046]

UDC 616.831-022:578.833.27].015.46

IMMUNOLOGIC STRUCTURE OF POPULATION AFTER ERADICATION OF TICKS IN NATURAL TICK-BORNE ENCEPHALITIS FOCUS

Moscow VOPROSY VIRUSOLOGII in Russian No 2, Mar-Apr 85 (manuscript received 19 Jun 84) pp 186-189

VORONTSOVA, T. A., Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow

[Abstract] Continuing observations begun by the author in Southern Udmurtiya in 1965, the status of the immunologic structure of the population with respect to tick-borne encephalitis was determined. It has been 10 years since tick eradication measures were undertaken in this area. Epidemiologic observations were performed in seven populated points, four villages in an untreated area, and three next to a forest which had been treated with DDT. Questioning and serologic studies were performed in late summer, involving 896 subjects, 269 of whom were serologically studied, 141 for the second time after 10 years' interval, 86 in the treated area, 55 in the untreated area. Thirty-two subjects were 11 to 15 years of age, 52 were

16 to 30, 40 were 31 to 40, 72 were 41 to 50, and 83 were 51 or older. The studies showed that the contact of the rural residents with the tick-borne encephalitis vector 10 years after treatment of the forest was seven times lower than the initial level, as opposed to 17 times lower after 5 years following treatment. The decrease in content of antibodies in the blood serum of young persons in this area should be considered also in organizing the collection of donor blood for the production of antiencephalitis gamma globulin. Only persons older than 30 to 40 years should be used for this purpose. Figures 1; references 6 (Russian).  
[019-6508/13046]

UDC 616.98:578.833.29]-036.21(571.63)

#### RESERVOIRS OF PATHOGEN OF HEMORRHAGIC FEVER WITH RENAL SYNDROME IN FOCI OF PRIMORSKIY KRAY

Moscow VOPROSY VIRUSOLOGII in Russian No 2, Mar-Apr 85 (manuscript received 28 May 84) pp 189-192

SLONOVA, R. A., KOSOY, M. Ye., ASTAKHOVA, T. I., KISLITSINA, I. S., SOLDATOV, G. M., BRAGIN, A. P., PAVLENKO, O. V., GORBATOV, N. A. and LOSHAKOV, V. Ye., Scientific Research Institute of Epidemiology and Microbiology, Siberian Department, USSR Academy of Medical Sciences, Vladivostok

[Abstract] Data are presented on the range of natural carriers of the pathogen of hemorrhagic fever with renal syndrome (HFRS), the epidemiologic and epizootologic significance of individual rodent species and certain factors influencing the intensity of circulation of the virus in natural foci in Primorskiy Kray. Some 6,362 small mammals of 18 species were caught and studied in 1980-1983. HFRS antibodies were found in 9 species of rodents including house mice, field mice, voles, hamsters, and rats. The percentage of rodents carrying the antibodies varies from 2 to 13. References 9: 6 Russian, 3 Western.  
[019-6508/13046]

UDC 616.61-002.151-022:578.833.29]-036.2(470.40)

#### HEMORRHAGIC FEVER WITH RENAL SYNDROME IN PENZA OBLAST

Moscow VOPROSY VIRUSOLOGII in Russian No 2, Mar-Apr 85 (manuscript received 25 May 84) pp 192-196

DZAGUROVA, T. K., POTRASHKOVA, K. I., TKACHENKO, Ye. A., BRYZGACHEVA, O. F., REZAPKIN, G. V., IVANOV, A. P., KLECHINA, V. T., AGAFONOV, A. V., KLIMOVA, T. I., KANDYBIN, V. D. and FROLOVA, M. G., Institute of Poliomyelitis and Viral Encephalitis, USSR Academy of Medical Sciences, Moscow; Penza Oblast Sanitary-Epidemiologic Station

[Abstract] Laboratory studies to establish the etiologic role of the HFRS virus in the development of suspicious outbreaks were undertaken in 1983 in

Penza Oblast in connection with a group outbreak of a disease among children suspected of being HFRS. The level of natural immunity for HFRS virus was determined among the population as well as among small mammals inhabiting the area. It is assumed that the children in the 1983 outbreak at a pioneer camp contracted HFRS by exposure to voles in the area. Five species of small mammals were found to have HFRS virus immunity. References 4 (Russian). [019-6508/13046]

UDC 618.7+616-053.31]-022:578.825.12]-036.2-078.73([47+57]-17)

EPIDEMIOLOGIC AND IMMUNOLOGIC STUDIES OF CYTOMEGALY IN MOTHERS AND NEWBORNS  
AMONG NATIVE AND IMMIGRANT POPULATION OF FAR NORTH

Moscow VOPROSY VIROSOLOGII in Russian No 2, Mar-Apr 85 (manuscript received 28 May 84) pp 215-218

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Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow

[Abstract] A study is presented of the occurrence of cytomegalovirus infection among mothers and neonates in the far north where the immunoundulating type of ecologic immune reaction is observed. Specific cytomegalovirus cells were observed in 30.8% of immigrant population, as opposed to 12.2% of the native population, in both cases more frequently in saliva than in urine. Complement-binding antibodies were observed in 51.92% of the native population, 52.90% of the immigrant population. Antibodies are found in mothers of both native and immigrant population in a higher percentage than in non-pregnant women, indicating possible activation of latent cytomegalovirus infection and elevated susceptibility and sensitivity to the virus among pregnant women. References 14: 8 Russian, 6 Western. [019-6508/13046]

## DETERMINATION OF HBsAg AND ANTI-HBs IN HEALTHY POPULATION OF VARIOUS CITIES IN USSR

Moscow VOPROSY VIRUSOLOGII in Russian No 2, Mar-Apr 85 (manuscript received 27 Apr 84) pp 231-233

VYAZOV, S. O., KOMPANIYETS, A. A., ANANYEV, V. A., LISTOVSKAYA, Ye. K., DARDIK, F. G., PIROZHKOVA, Z. P., LEYBENZON, A. S., MCHEDLISHVILI, I. M., SAKVARELIDZE, L. O., VOROBAY, V. S. and REYNARI, I. K., Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences; Kazak Scientific-Research Institute (NII) of Epidemiology, Microbiology and Infectious Diseases, KaSSR Ministry of Health (MH), Alma-Ata; Zaporozhye Oblast Sanepid Station; Tbilisi Medical Institute; NII of Epidemiology, Microbiology and Hygiene EsSSR MH, Tallinn

[Abstract] Information on the incidence of infection caused by the hepatitis B virus in the USSR is limited and inaccurate due to the use of insensitive methods of determining hepatitis B markers. This report presents the results of determining HBsAg and anti-HBs among the population of several cities in various geographic zones using radioimmunologic analysis. The areas studied fall into the WHO classification of intermediate endemic areas. It is concluded that in Moscow and Tallinn the population is primarily infected in later age groups than in Zaporozhye, Tbilisi, Ashkhabad, and Alma-Ata, where children are most frequently infected. HBsAg was found in 3.0% (Moscow) to 6.1% (Tbilisi and Alma-Ata) of the population, anti-HBs in 23.0 (Zaporozhye) to 37% (Alma-Ata) of the population. It is concluded that finding hepatitis B markers in one or more groups of the population cannot be used as a basis to judge the nature of the epidemic process as a whole, even over a limited area. References 8: 7 Russian, 1 Western.

[019-6508/13046]

UDC 614.31:615.919.582.282]-07(574)

## AFLATOXIN CONTAMINATION OF RAW FOOD MATERIALS, FOOD PRODUCTS, AND FORAGE IN KAZAKH SSR FROM 1981 TO 1983

Moscow VOPROSY PITANIYA in Russian No 3, May-Jun 85 (manuscript received 18 Jun 84) pp 63-66

[Article by M. Ye. Kulmanov, Republic Scientific-Practical Center for Environmental Hygienic Problems, Alma-Ata]

[Excerpts] One of the tasks of the Republic Scientific-Practical Center for Environmental Hygienic Problems, which has been in operation since 1980 in the Kazakh SSR, is to study the frequency and extent of food product contamination by foreign substances, particularly mycotoxins [2]. The present work summarizes the results of a systematic study of aflatoxin contamination of the most prevalent types of raw food and food products in Kazakhstan, including mixed feeds, for the period 1981 - 1983.

Table 1. Frequency and Extent of Aflatoxin Contamination of Raw Food, Food Products and Feed in the Kazakh SSR

① Объект исследования	② число изученных образцов	③ Афлатоксин В <sub>1</sub>		④ Афлатоксин В <sub>2</sub>		⑤ Афлатоксин G <sub>1</sub>		⑥ Афлатоксин G <sub>2</sub>	
		⑦ число загрязненных образцов	⑧ уровень загрязнения, мкг/кг	⑦ число загрязненных образцов	⑧ уровень загрязнения, мкг/кг	⑦ число загрязненных образцов	⑧ уровень загрязнения, мкг/кг	⑦ число загрязненных образцов	⑧ уровень загрязнения, мкг/кг
Кукуруза ⑨	198	54	1,0-900,0	15	0,5-10,3	0	0	0	0
Пшеница ⑩	249	22	1,2-17,3	7	1,1-5,7	1	0,1	0	0
Пшеничная мука ⑪	142	10	1,0-3,4	0	0	0	0	0	0
Рис ⑫	97	4	1,2-2,2	0	0	0	0	0	0
Ячмень ⑬	85	11	0,6-14,5	3	0,6-1,6	1	0,6	1	0,5
Соя и изоляты ⑭	77	13	0,6-4,4	1	0,5	0	0	0	0
Рожь ⑮	68	0	0	0	0	0	0	0	0
Горох ⑯	39	1	1,6	0	0	0	0	0	0
Орехи (фундук, арахис) ⑰	24	4	9,0-19,0	2	0,5-1,6	1	15,0	0	0
Молоко и молочные продукты ⑱	576	—	—	—	—	—	—	—	—
Чай (импортный) ⑲	28	3	1,0	0	0	0	0	0	0
Комбикорма ⑳	244	100	1,3-210,0	19	0,3-5,0	10	0,2-25,0	4	0,5-0,7

Примечание. Афлатоксин М<sub>1</sub> в следовых количествах обнаружен только в 5 образцах молочных продуктов.

Key:

1. Object of investigation
2. Number of examined samples
3. Aflatoxin B<sub>1</sub>
4. Aflatoxin B<sub>2</sub>
5. Aflatoxin G<sub>1</sub>
6. Aflatoxin G<sub>2</sub>
7. Number of contaminated samples
8. Level of contamination, mcg/kg
9. Corn
10. Wheat
11. Wheat flour
12. Rice
13. Barley
14. Soybean, protein and soybean isolates
15. Rye
16. Peas
17. Nuts (hazel nuts, peanuts)
18. Milk and dairy products
19. Tea (imported)
20. Mixed feed
21. Notation. Trace amounts of aflatoxin M<sub>1</sub> were found only in five samples of the dairy products.

As can be seen from Table 1, aflatoxins are most frequently found in corn (in 27.2% of the cases), soybean and nuts (16.8% and 16.6%). The frequency of aflatoxin detection in wheat and barley takes an intermediate position at levels of 8.8% and 12.9% respectively. One should note the presence of aflatoxin B<sub>1</sub> in an imported product (tea) as well as the trace amounts of aflatoxin M<sub>1</sub> in milk and dairy products. Practically no amount of aflatoxin was found in rye and peas.

It is noteworthy that the highest level of aflatoxin B<sub>1</sub> contamination was found in corn (up to 900 mcg/kg) and mixed feeds (up to 210 mcg/kg). The aflatoxin B<sub>1</sub> contamination of wheat, nuts, and barley was not high with maximal levels of 17.3, 14.5, and 19.0 mcg/kg respectively. The extent of contamination in the remaining products was lower and did not exceed the 5 mcg/kg limit established in the USSR. The frequency and level of aflatoxin contamination of processed wheat products (wheat flour) were exceptionally low, and we were able to detect aflatoxins in only 10 out of 142 samples at a concentration under 3.4 mcg/kg.

Aflatoxin B<sub>2</sub> was found in 7.9% of the corn samples, along with aflatoxin B<sub>1</sub>, although the former was at significantly lower concentrations, with the maximum level under 10.3 mcg/kg. Aflatoxin B<sub>2</sub> was also found in 7 out of 249 samples of wheat in a concentration under 5.7 mcg/kg. Aflatoxin B<sub>2</sub> was also found in trace amounts under 1.6 mcg/kg in some samples of nuts, barley, and soy beans. Aflatoxin G<sub>1</sub> in trace amounts was found in one sample of wheat and barley, and G<sub>1</sub> and G<sub>2</sub> aflatoxins were also found in

trace amounts in one sample of barley. The level of aflatoxin B1 contamination in nuts did not exceed 19 mcg/kg. Aflatoxin G2 was found in one sample in the amount of 15 mcg/kg.

Table 2. Changes in the Frequency and Level of Aflatoxin B1 Contamination of Corn, Wheat and Mixed Feeds in the Kazakh SSR between 1981 and 1983.

1 Объект исследования	2 Год исследования	3 Число изученных образцов	4 Число положительных проб		5 Медиана*, мкг/кг	6 90 % уровень**, мкг/кг
			7 всего	8 с уровнем загрязнения более 5 мкг/кг		
9 Кукуруза	1981	102	29	20	0	35,1
	1982	51	11	10	0	63,6
	1983	45	14	12	0	177,0
	Всего	198	54	42		
10 Пшеница	1981	72	10	3	0	1,36
	1982	82	8	6	0	0,57
	1983	95	4	1	0	0,00
	Всего	249	22	10		
11 Комбикорма	1981	84	31	25	0	35,1
	1982	86	23	16	0	14,57
	1983	74	46	35	0	43,7
	Всего	244	100	76		

12 \* Уровень загрязнения среднего образца исследованных образцов, расположенных по возрастающей степени загрязнения. \*\* Уровень загрязнения образца, превышающего по этому показателю 90 % всех исследованных образцов.

Key:

1. Object of investigation
2. Year of investigation
3. Number of studied samples
4. Number of positive tests
5. Median\*, mcg/kg
6. 90% level\*\*, mcg/kg
7. Total
8. At a contamination level greater than 5 mcg/kg
9. Corn
10. Wheat
11. Mixed feed
12. \* The contamination level of an average sample of the examined samples are given in the ascending order of contamination. \*\* The contamination level of a sample that exceeds this indicator in 90% of all examined samples.

A high frequency (40.9%) of aflatoxin contamination, particularly aflatoxin B1 (100 out of 244 samples with a maximum contamination level under 210 mcg/kg) was characteristic of the mixed feeds. Aflatoxin B2 was found in 19 samples of feed at a concentration under 5.3 mcg/kg. Aflatoxin G1 was found in 10 samples at a concentration of from 0.2 to 25.0 mcg/kg, and aflatoxin G2 was found in trace amounts (0.5 - 0.7 mcg/kg) in four samples.

Thus, the result of this fairly representative study allows us once again to emphasize the potential hazard posed by aflatoxin B1.

The data presented do not allow us to provide a true picture of the level of aflatoxin B1 contamination of the examined samples. In consideration of that fact as well as the need to identify the aflatoxin B1 contamination characteristics of food products, we attempted to analyze the dynamics of time changes in the frequency and level of contamination in the most important grain products as well as mixed feeds.

As can be seen from Table 2, the greatest part of the samples does not contain aflatoxin B1. Therefore, the corresponding medians are characterized by a zero level of contamination. The increasing level of aflatoxin B1 contamination of corn over time is cause for considerable alarm. Thus, whereas the 90-percent level of contamination in 1981 was 35.1 mcg/kg, in 1982 it was 63.6 mcg/kg, and in 1983 it was already 177 mcg/kg. In analyzing the reason for this high level of concentration, we found that, in the first place, the contamination was local in character since the contaminated test samples of corn were primarily obtained from farms in the Alma-Ata Oblast. In the second place, the summers of 1982 and 1983 in this oblast were hot and dry so that the storage conditions in some granaries were not satisfactory. This situation was also apparently affected by the insufficient number of examined samples (36 and 51 in 1982 and 1983 respectively) in comparison to the number tested in 1981.

On the basis of the investigations undertaken, one can draw the unequivocal conclusion that there is a real danger of aflatoxin B1 contamination of both edible and forage corn in Kazakhstan. Moreover, one must take note of the recent increasing level of contamination which is indicative of the need for intensified controls on part of the sanitation-epidemiological services and the immediate adoption of measures aimed at preventing the formation of aflatoxins in areas where grain is produced, transported, and stored.

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CSO: 1840/073

UDC 613.281:664.951.812]:613.295

## TECHNOCHEMICAL CHARACTERISTICS OF CANNED 'NATURAL ANTARCTIC KRILL MEAT' AND ITS FOOD VALUE

Moscow VOPROSY PITANIYA in Russian No 2, Mar-Apr 85 (manuscript received 30 Mar 84) pp 69-72

[Article by A. P. Yarochkin, L. N. Rol, L. T. Kovekovdova, and M. P. Lapardin, Pacific Ocean Scientific-Research Institute of Fishing and Oceanography, Vladivostok: "Technochemical Characteristics of Canned Natural Antarctic Krill Meat and Its Food Value"]

[Text] The fishing industry of the Far East has assimilated the manufacture of canned "Natural Antarctic Krill Meat."

The goal of this work is to study the technochemical characteristics and biological value of canned meat from a new source--Antarctic krill.

The proportion of the components making up the canned meat and the chemical composition were determined by the standard method (2), the lipid content according to the method of E. Bligh and W. Dyer (6), the fraction composition by thin-layer chromatography, the fatty acid composition by gas-liquid chromatography on a G-180 Yenako chromatograph, the amino acid composition of proteins by the method of S. Moor and W. Stein (7) on a Hitachi 835 amino acid analyzer, tryptophan was determined after alkaline hydrolysis using the method of N. N. Krylova and Yu. N. Lyaskovskaya (1), and the biological value of the proteins by their chemical score in percent of the amino acid reference scale of the U.S. Food and Agriculture Organization and the World Health Organization (3). The concentration of iron, zinc, calcium, and copper was determined using a flame version of atomic-absorption analysis, on an AA-855 Nippon Jarrell-Ash instrument, and tin, aluminum, lead, cobalt, and cadmium using a graphite version of the atomic-absorption method, on a Hitachi 170-70 instrument.

Table 1--Chemical Composition of Canned Krill and Crab Meat

<u>Meat Studied</u>	<u>Moisture, %</u>	<u>Concentration in the Dry Substance, %</u>		
		<u>Protein</u> <u>(N x 6.25)</u>	<u>Lipids</u>	<u>Ash</u> <u>Content</u>
Krill	79.8	86.0	5.9	7.7
Crab	76.4	88.6	3.6	8.8

The biological assessment of the canned meats compared to nonsterilized frozen krill meat was carried out by a combined method on growing male white rats with an original mass of 44 grams. The experimental rations contained 10 percent protein from the products studied and were isocaloric. Based on the low-growth and balance indicators in the adaptation and balance periods of the experiment, we calculated the dynamics of the mass of the animals, the protein effectiveness ratio (PER), the apparent assimilability of nitrogen ( $D_{ap}$ ), the apparent biological value ( $BV_{ap}$ ), the apparent pure utilization of protein ( $NPU_{ap}$ ), and also the biological potential.

The energy value (EV kJ/kg) of the canned meats was calculated by the method of A. A. Pokrovskiy (4).

It was observed that during canning of 105 grams of krill meat and 0.5 grams of salt, after sterilization the mass of the brick is 85-86 grams, and the broth is 19-20 grams. The main component of the dry substance of the canned meats is protein with a relatively low level of lipids. Canned krill meat is much like crab in its chemical composition (Table 1).

The energy value of canned krill and crab meat, calculated based on data on the energy value of food substances, amounts to approximately 380 kJ/kg.

Table 2--Composition of Fatty Acids of Lipids in Canned Krill Meat

<u>Acid</u>	<u>Concentration, %</u>	<u>Acid</u>	<u>Concentration, %</u>
12:0	0.2	18:1	12.9
14:0	4.0	18:2w 6	3.1
15:0	0.4	18:3w 3+	1.2
16:0	18.8	22:1	
		18:4w 3	1.0
16:1	3.5	20:4w 6+	1.4
		22:1	
17:0	0.4	20:4w 3	0.8
16:2	0.3	20:5w 3	25.2
18:0	0.7	22:6w 3	26.0

Canned krill meat contains an average of 1.4 percent lipids in the wet mass and has the following fraction composition (in percent): polar lipids--39.9, monodiglycerides--4, cholesterol--16.4, free fatty acids--10.2, triglycerides--29.3.

We carried out an analysis of the fatty acid content of lipids (Table 2).

Analysis of the amino acid composition of proteins of the canned krill meat showed that almost all essential amino acids are contained in quantities greater than the level in an "ideal" protein (Table 3). The limiting amino acid was valine.

Table 3--Amino Acid Composition and Protein Score of Canned Krill Meat

<u>Amino Acids</u>	<u>A</u>	<u>Amino Acids</u>	<u>A</u>
Isoleucine	4.71(118)	Histidine	2.37
Leucine	7.62(103)	Arginine	7.24
Methionine		Aspartic acid	10.47
+ cystine	4.24(121)	Glutamic acid	16.08
Phenylalanine		Proline	3.56
+ tyrosine	8.25(138)	Glycine	4.38
Threonine	3.99(100)	Alanine	5.52
Tryptophan	1.6(160)	Serine	4.13
Valine	4.53(91)		
Lysine	9.85(179)		

Note--A is the concentration of amino acids (in grams per 100 grams of protein), the number in parentheses is the chemical score (percent relative to the reference scale of the United States Food and Agriculture Organization, 1973).

Analysis of the mineral components of the canned meats showed that highly toxic elements--mercury, lead, arsenic--and biologically active elements--copper, zinc, tin and iron--occur in quantities below the maximum permissible levels (Table 4).

The results of research on the protein effectiveness of krill meat and sterilized canned krill are presented in Table 5. Mass-growth research revealed a tendency for protein effectiveness to be lowered due to the effect of high temperatures on the proteins during sterilization of the canned meats.

Table 4--Concentration of Certain Mineral Components in Canned Krill Meat and Fish, and Their Maximum Permissible Levels (in mg per 1 kg of dry substance)

<u>Element</u>	<u>Canned Meat</u>			<u>Fish</u>	<u>Maximum Permissible Levels for Fish (5)</u>
	<u>Solid Portion</u>	<u>Broth</u>	<u>Average Sample</u>		
Na	22519.00	35473.00	22379.00	--	--
Ca	3905.00	4000.00	3910.00	--	--
Zn	65.60	10.70	62.20	50.0	175.0-250.0
Fe	22.60	45.20	24.00	50.0	500.0
Cu	4.70	4.60	4.70	7.5	25.0-50.0
Al	1.90	3.70	1.90	12.5	100.0-500.0
Pb	1.40	0.20	1.40	2.25	10.0-25.0
Mn	0.90	0.60	0.90	4.5	--
Cd	0.10	0.03	0.10	0.50	0.1
Sn	0.10	0.20	0.10	10.00	1250.0
As	0.1	0.1	0.1	5.00	2.5-5.0
Hg	0.1	0.1	0.1	0.75	2.5-5.0
Co	0	0	0	0.5	--
Mo	0	0	0	1.85	--

Note--The data of I. M. Skurikhin (5) are recalculated for dry substance from a calculation of 80 percent moisture content of the fish.

Table 5--Protein Effectiveness of Sterilized Canned Krill  
and Boiled Frozen Krill

<u>Indicator</u>	<u>Casein</u>	<u>Frozen Meat</u>	<u>Canned Meat</u>
Mass increase, grams	22.0	13.5	12.0
Amount of food eaten, grams	68.0	59.2	65.5
Amount of protein eaten, grams	7.48	6.1	6.2
PER	2.94	2.2	1.9

Table 6--Biological Value of Sterilized Canned Krill Meat  
and Boiled Frozen Krill Meat

<u>Indicator, %</u>	<u>Casein (Control)</u>	<u>Frozen Meat</u>	<u>Canned Meat</u>
Apparent assimilability of nitrogen ( $D_{ap}$ )	97.8	94.2	89.3
Apparent biological value ( $BV_{ap}$ )	89.0	86.8	86.8
Apparent pure utilization of protein ( $NPU_{ap}$ )	79.5	81.2	77.6

Mass-growth indicators agree fairly well with calculated data on the biological value of the products studied, which were obtained as a result of determining the balance of nitrogen (Table 6). Boiled frozen krill meat was slightly inferior to casein in its biological value. Sterilization of canned meats markedly reduces the biological value of the product: thus, the assimilability of protein is reduced by 5.2 percent, while the pure utilization of protein is reduced by 4.5 percent.

The concentration of cholesterol in the blood serum of experimental animals was 1.5 times lower on the average than for animals receiving a meat ration. An important indicator characterizing the lipotropic properties of the products and the activity of their protein complex is the fats/nitrogen ratio of the liver. A high concentration of nitrogen in the liver with a low concentration of fat is a confirmation of the lipotropic property of the products studied.

Thus, the overall chemical composition of canned "Natural Antarctic Krill Meat" is very much like similar canned crab meats. The protein effectiveness of krill meat is reduced somewhat in the process of sterilizing the canned meats, but their biological value is high and they are only slightly inferior to casein. A ration of canned krill reduced the cholesterol level in the blood of rats.

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12255

CSO: 1840/71

## GENETICS

### SHORTAGE OF GENETICISTS IN KIRGHIZIA

Frunze SOVETSKAYA KIRGIZIYA in Russian 19 Sep 85 p 3

[Abstract] In connection with a recent All-Union school on genetics held in Kirghizia, Yu. Blyum, correspondent of KirTAG [sic], took the opportunity to interview Academician A. A. Sozinov, who headed the school. The latter's responses made it apparent that despite the importance of modern genetics and genetic engineering in the progress of society and science, this area of scientific endeavor is badly neglected in Kirghizia. The Institute of Biology of the Kirghiz SSR Academy of Sciences doesn't even have a genetics laboratory, and agriculture has to rely on out-of-date methods of selection and breeding. It is in recognition of these deficiencies in Kirghizia that the present All-Union school was held in the Kirghiz SSR both to inspire and stimulate a more rational and serious approach to modern genetics. The time is ripe for a change in the attitude toward genetics on the part of the Kirghiz SSR Academy of Sciences and the various governmental bodies, and the central authorities will do everything that is in their power to encourage a more positive outlook.

[103-12172/13046]

SELECTIVE CYTOTOXICITY OF ANTIBODY-RICINE A-CHAIN CONJUGATE FOR HUMAN  
MALIGNANT CELLS

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 19, No 4, Jul-Aug 85  
(manuscript received 29 Mar 84) pp 1034-1041

TONEVITSKIY, A. G., All-Union Cardilogic Science Center of USSR Academy of  
Medical Sciences, Moscow

[Abstract] Conjugates of whole toxins or their subunits with antibodies reacting with cell surface receptors are known as immunotoxins. They are used for directed removal of malignant cells in cell cultures and in whole organs. The goal of the present work was to obtain a conjugate of A-chain of ricine ( $R_A$ ) with rabbit antibodies to normal human IgG C-chains and to evaluate the action of such a hybrid on the cell of Burkitt EV-3 lymphoma. Heterobifunctional reagent N-succinimidyl-3(2-pyridyldithio)propionate was used as the conjugating agent. Both components preserved their biological activity after conjugation, inhibiting protein synthesis in rabbit reticulocyte system and binding to human IgG fixed on a solid phase carrier. The conjugate inhibited 50% of protein synthesis at a dose of  $1.4 \cdot 10^{-9}$  M and appeared to be a potent cytotoxic agent against surface IgG positive Burkitt lymphoma EB-3 cells; it was 100-fold as effective as antibodies, or Ricine A-chain alone or even Ricine A-chain-normal rabbit IgG conjugate. The model system used is simple and easy to use because it has easily accessible specific surface marker: immunoglobulin that could be isolated in large quantities. Figures 7; references 20: 2 Russian, 18 Western.  
[126-7813/13046]



UDC 616.056.3:612.017.12/32:612.014.46:615.31:547.745+615.31:547.391.1

ALLERGENICITY OF OVALBUMIN CONJUGATED WITH ACRYLIC ACID-N-POLYVINYL-  
PYRROLIDONE COPOLYMER

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 283, No 6, Aug 85 (manuscript received 2 Apr 85) pp 1513-1516

PETROV, R. V., academician, KHAITOV, R. M., GUSHCHIN, I. S., BOGUSH, N. L.,  
PUCHKOVA, N. G. and NEKRASOV, A. V., Institute of Immunology, Moscow

[Abstract] An analysis was conducted on the allergenic potential of chicken ovalbumin mixed with or conjugated to a copolymer of acrylic acid-N-polyvinylpyrrolidone. Analysis of the immune response in terms of IgG<sub>1</sub> homocytotropic antibodies and IgE and CBA mice demonstrated that intraperitoneal administration of the ovalbumin, ovalbumin-copolymer mixture, or ovalbumin-copolymer conjugate (covalently linked via 1-ethyl-3(3-dimethylaminopropyl)carbamide) induced an equivalent rise in IgG<sub>1</sub> and IgE, without a concomitant rise in total IgG (i.e., antibodies without homocytotropic activity). The findings demonstrated that allergenicity of ovalbumin was retained on mixing or conjugating with the polyelectrolyte in question, and that the immunostimulatory effects of the copolymer did not affect the induction of antibodies responsible for immediate hypersensitivity. This suggests that antigens or their determinants that are utilized in artificial vaccines (i.e., mixtures or conjugates with large carriers) should not acquire allergenic properties. Figures 2; references 12: 9 Russian, 3 Western.  
[86-12172/13046]

UDC 615.371:578.891].015.4.07

STUDY OF SPECIFIC INNOCUOUSNESS AND IMMUNOGENICITY OF SUBUNIT HEPATITIS B  
VACCINE

Moscow VOPROSY VIRUSOLOGII in Russian No 3, May-Jun 85 (manuscript received 28 Jun 84) pp 324-327

VYAZOV, S. O., VLASIKHINA, Ye. M., MARGOLINA, A. N., FAVOROV, M. O.,  
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Health, Moscow

[Abstract] Results are presented from a study of the innocuousness and immunogenicity of a hepatitis B vaccine prepared on the basis of the surface hepatitis B antigen (HBsAg) on human volunteers. One vaccine dose contained 20 micrograms of HBsAg adsorbed on 1 mg of aluminum hydroxide suspended in 1 ml of isotonic sodium chloride solution, pH 6.7. The preparation was initially tested for sterility, apyrogenicity, absence of secondary infectious agents, content of antibodies, immunogenicity on laboratory animals and innocuousness in accordance with the recommendations of WHO. Test subjects

included 20 male volunteers 21 to 40 years of age with no hepatitis B markers in the blood according to radioimmunologic analysis. Three doses of vaccine were administered subcutaneously at intervals of 1 month, followed by a fourth injection after 6 months. Results of the tests indicate that the domestic subunit vaccine against hepatitis B has high immunogenicity, little reactogenicity, and is safe for use. Figures 2; references 18: 5 Russian, 13 Western.  
[021-6508/13046]

UDC 578.245.04:615.218:546.41

#### CALCIUM CHLORIDE MODULATION OF INTERFERON FORMATION INDUCTION

Moscow VOPROSY VIRUSOLOGII in Russian No 3, May-Jun 85 (manuscript received 28 Jun 84) pp 347-350

ORLOVA, T. G., BOKHONKO, A. I., MAMONTOVA, T. V. and KOGNOVITSKAYA, A. I.,  
Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow

[Abstract] Treatment of cells with  $\text{Ca}^{2+}$  ions has a stimulating effect in various interferon-producing systems and at various stages of interferon production. This article studies the influence of  $\text{Ca}^{2+}$  ions on a blocking activity of a factor present in normal noninduced cells. The inhibiting factor donor cells were mouse L. cells in a 3-day monolayer culture. The inhibiting factor recipient cells were 3-day monolayer cultures of mouse L. cells. The influence of  $\text{CaCl}_2$  added to the L. cells 18 hours before induction and during adsorption of poly(I)poly(C) on interferon production was studied. It was found that calcium chloride increases production of interferon by a factor of 8 or, when DEAE dextran is present, which itself stimulates the production of interferon, by a factor of 2. Two series of experiments studied the influence of calcium chloride on the activity of the inhibiting factor. Calcium chloride was found to have a neutralizing effect on the inhibitor in addition to its stimulation of interferon production. Figures 1; references 7: 3 Russian, 4 Western.  
[021-6508/13046]

## MARINE MAMMALS

### DOLPHIN NEONATAL BEHAVIOR

Moscow SOVETSKAYA ROSSIYA in Russian 16 Oct 85 p 6

ISTOMIN, V., Novorossiysk

[Abstract] Scientists of the Institute of Evolutionary Morphology and Ecology of Animals imeni A. N. Severtsov, USSR Academy of Sciences discovered a natural site for a sea colony at the Malyy Utrish cape and proceeded to establish there the second dolphin aquarium in the Soviet Union. During a staged performance, Fifa--one of the principal dolphin actors--gave birth to her offspring, making it possible for the scientists to observe early post-natal behavior of these animals under practically natural conditions. In the future it will be necessary to clean the bottom of this lagoon so as to be able to observe these animals at greater depth.

[136-7813/13046]

## MEDICINE

### LUBRICANT FOR SKELETAL ARTIFICIAL JOINT

Moscow IZOBRETATEL I RATSIONALIZATOR in Russian No 8, Aug 85, pp 16-17

[Article by special correspondent M. Karlov under the rubric "Ideas and Solutions: Medical Technology"]

[Text] An artificial prosthesis placed inside the body has for the first time been furnished with an outside-controlled lubrication system. A fluid composition has been invented for such lubrication of hinges and ailing joints.

There are many designs of artificial joints, but nearly all quickly wear out from friction. V. V. Vasilenkaytis, head of the department of joint biomechanics and laser therapy of the Institute of Experimental and Clinical Medicine of the Lithuanian SSR Ministry of Health, has discovered a way to lubricate an artificial or natural joint without performing a surgical operation each time (Patent No. 1 127 584). Together with Prof. A. A. Matulis, director of the institute, the scientists have also found a composition for lubrication of a prosthesis and treatment of ailing joints.

It was attempted to replace damaged portions of joints with various materials as far back as 100 years. Numerous plastic (restorative) operations have been proposed. Techniques of total replacement of living joints with artificial structures have been developed: the inventions of professors K. M. Sivash (Moscow), Ya. I. Shersher (Saratov) and others. And the Estonian scientist and inventor A. I. Seppo (IR, 4, 78, p. 32; 83, 1, p. 32) has developed a procedure for growing new natural joints in place of damaged ones. But the Seppo procedure cannot be used for all ailments. And the prostheses implanted in a limb are quickly worn down by the constant friction of the surfaces. The patient must be subjected to continuous operations. Not all patients consent to this; but each year half a million artificial joints are implanted.

It is especially hard to treat deforming osteoarthritis (change in the structure and disintegration of the bones and cartilage in the region of the pelvic joint and femur) and rheumatoid arthritis (inflammation of the joint). These are common and very widespread diseases, with still no total cure. The disease results in acute insufficiency of sinovial fluid, which is produced by the joint itself and lubricates the joint; or the lubrication will be done by

pathologically altered and inferior fluid, having impaired lubrication properties. This leaks out of the joint cartilage during movement like water from a sponge, the coefficient of friction is sharply increased in the joint, the cartilage dries out, becomes thin and cracks. The joint loses its superb natural properties, its lubrication is worsened, and a gradual loss of elasticity begins. This is a pathological process--the joint crackles during walking.

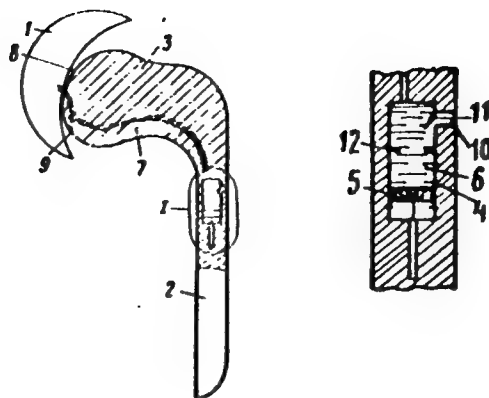
Given current knowledge, capabilities and materials, it is not all that difficult to design an artificial joint. But V. V. Vasilenkaytis has created that which no one else has done before: a self-lubricating joint. The "beauty" of the solution consists in the fact that the lubrication mechanism located in the human body is controlled from the outside by an electromagnetic field.

Consider the schematic diagram of the endoprosthesis. It looks something like a syringe, the cylinder of which has a check valve. Prior to implantation, the check valve is depressed and the reservoir fills with artificial sinovial fluid (10-15 ml) through an orifice. When it is necessary to dispense a portion of lubricant, an electromagnetic field is created at the outside. This is done by using an ordinary standard electromagnet, which is moved along the joint. The piston in the cylinder is raised, pressing out the lubricating fluid through a channel to the rubbing surfaces.

But the fluid will some day run out. How to replenish it? An ordinary syringe punctures the skin (under x-ray or ultrasonic monitoring) and fills the reservoir through the orifice 10 by pressure against the check valve. Under the pressure of the fluid, the piston returns to the starting position. The lifetime of the endoprosthesis is increased by virtue of the reduced friction (the coefficient of friction in the old designs is 0.25, that in the new design 0.08).

The mechanical aspect of the matter was solved. It was now necessary to find a formula for an artificial sinovial fluid. Naturally, this had not only to comply with the requirements for a lubricant, but also satisfy the doctors (which is more difficult): i.e., not produce undesirable complications in the body or side effects, have a minimum of contraindications, exert a curative effect if possible and so on. In short, it was necessary to receive an authorization from so demanding an organization as the USSR Pharmaceutical Committee.

Vasilenkaytis and Matulis began with the immediate assumption that the fluid should be based on medical polymers and biopolymers. After a lengthy and scrupulous selection of ingredients and 15 years of testing they found that polymer solutions of polyvinylpyrrolidone and its complexes with hyaluronic acid are closest in lubricating and all other characteristics to the natural lubricant. After toxicological and bacteriological investigations they tested rabbits with artificially-induced disease of the joints. The experiments were successful. Today, the new method of therapy has been tested on more than 500 patients. The fluid has been injected not only into artificial, but also natural joints afflicted with various ailments.



Design of the new "hinge", e.g. for the pelvic-femoral joint, containing two actual endoprostheses: a prosthesis for the cotyloid cavity (1) of the pelvis and a prosthesis for the end of the femur, consisting of a limb (2) and a spherical head (3). A cylindrical reservoir (4) of nonmetallic material with ferromagnetic piston (5) is installed in the prosthesis for the end of the femur. The reservoir is filled with artificial sinovial fluid (6) and is connected by a channel (7) to the rubbing surface (8) of the spherical head, which has lubrication orifices (9). The bone endoprosthesis has an orifice (10) in which a check valve (11) is installed. The reservoir has a stop (12) for the travel of the piston.

The new preparation produces no undesirable side effects (observation period of patients up to 10 years). Moreover, the injection of the artificial fluid substantially restores the natural lubrication system, exerts an antiinflammatory action and improves the metabolism within the joint.

Clinical testing has yielded such "secondary" effects as not even the scientists anticipated. It turned out that preparations based on the artificial fluid may be used in clinical practice as extenders of the action of antibiotics, hormones, etc.

The USSR Pharmaceutical Committee has approved the preparation.

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12717

CSO: 1840/120

## NEW MATERIALS, INSTRUMENTS DEVELOPED

Moscow ZNANIYE-SILA in Russian Vol 698, No 8, 1985, p 3

[Excerpt]

### Radiothermometer

How do we measure temperature when we fall ill? We insert a thermometer, and that is all there is to that. But this method does not satisfy medical workers. First of all it is imprecise. Second, physicians sometimes need to peer deep into the human body, to determine the temperature of internal organs affected by disease. But how is this done?

It is done with an ultrahigh frequency radiothermometer developed in the Gorkiy Scientific Research Radio Physics Institute jointly with the Gorkiy Medical Institute imeni S. M. Kirov. The instrument's sensitive antennas perceive thermal emissions from organs situated up to 15 centimeters deep. This is what makes the new instrument fundamentally different from the heat sensors used today, which permit determination of only the temperature of human skin.

In the decimeter wave range in which the radiothermometer works (the wavelength is 30 centimeters), the intensity of thermal radiation is directly proportional to the temperature of the heat emitting organ.

The measuring process itself does not cause any unpleasant sensations to the individual; it is totally harmless because it records thermal emissions. The instrument itself is small, and it is powered by standard current or by batteries. All of this makes it convenient to use under all conditions.

A radiothermometer can be used to detect inflammatory processes in internal organs--the liver, stomach, brain and others--at an early stage. Moreover, the radiothermometer can be used in physiotherapy to dose and monitor physiotherapeutic treatments, and it can be used in biomedical research. In veterinary medicine, it is also suitable for determining diseases in animals.

11004/13046

CSO: 1841/155

UDC 678.84.074:61

#### SILOXANE POLYMERS IN MEDICINE: PROBLEMS AND PROSPECTS

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IMENI D. I. MENDELEYEVA  
in Russian Vol 30, No 4, Jul-Aug 85, pp 455-460

YUZHELEVSKIY, Yu. A., doctor of chemical sciences, All-Union Scientific Research Institute of Synthetic Rubber, and SOKOLOV, S. V., professor, All-Union Scientific Research Institute of Synthetic Rubber

[Abstract] Siloxane elastomers are the most broadly used and in many cases the only suitable elastic materials for the creation of endoprostheses. One great advantage of siloxane rubbers is their ability to exist in the form of fluids with a broad range of viscosities capable of curing to form high molecular weight cross-linked polymers under moderate conditions which can be withstood by human tissue. The chemistry of these substances is outlined. Practical applications of siloxane materials in medicine achieved to date are described. Tasks for the future are noted, including the creation of strong and hemocompatible composite materials for the creation of an artificial heart, creation of strong tissue-compatible material for use in bone prostheses, synthesis of liquid compositions curing at body temperature to stop blood flow, creation of artificial skin, creation of hemo- and tissue-compatible materials with good adhesion to living tissues, synthesis of low-viscosity hemocompatible organosilicon compositions curing the moment they contact blood or lymph, and the creation of a transparent elastic material which swells upon contact with tears and retains its properties in contact with the cornea. References 39: 14 Russian, 25 Western.

[043-6508/13046]

UDC [677.46/49:677.027.62]:61

#### CHEMISTRY OF MEDICAL FIBERS AND TISSUES: SUCCESSES AND PROBLEMS

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IMENI D. I. MENDELEYEVA  
in Russian Vol 30, No 4, Jul-Aug 85, pp 447-454

VIRNIK, A. D., doctor of chemical sciences, Department of Chemical Fiber Technology, Moscow Textile Institute

[Abstract] General purpose natural and synthetic fibers and filaments have long been used in medicine. They are now being joined by special-purpose



fiber materials with special properties, including antimicrobial fibers and fabrics, hemostatic materials, biodegradable surgical suture and dressing materials, fibers with immobilized enzymes and other physiologically-active substances, hollow fibers, and fibrous sorbents. Each of these types of special purpose fibers and fabrics is discussed in general terms in this review of the Soviet and Western literature. It is concluded that methods have now been developed for the production of fiber materials having valuable properties for application in medicine, and in many cases a relationship has been established between the structure of the polymer materials and their biological activity. The effectiveness of the use of these fiber materials for medical purposes has been demonstrated. References 74: 54 Russian, 20 Western.  
[043-6508/13046]

UDC 611-018.2+541.6; 61+577.1:612.744

#### SYNTHESIS AND APPLICATION OF POLYURETHANES IN MEDICINE

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IMENI D. I. MENDELEYEVA in Russian Vol 30, No 4, Jul-Aug 85, pp 438-446

LIPATOVA, T. E., professor, doctor of chemical sciences, and LIPATOV, Yu. S., academician, Ukrainian SSR Academy of Sciences, doctor of chemical sciences, Director, Institute of High Molecular Weight Compound Chemistry, Ukrainian SSR Academy of Sciences

[Abstract] Polyurethanes and related compounds are very interesting as raw materials for the construction of biodegradable, biocompatible polymers. The mechanism of biological destruction of polyurethanes is discussed, and a ranking of the groups and bonds present in polyurethane in terms of probability of hydrolysis is presented. The introduction of medication substances to medical polyurethanes can be of decisive significance for the survival of an allotransplantate. Introduction of pharmacologic substances results in the production of materials which serve as a drug pool in the body. Diffusing from the polymer materials, the drugs have a prolonged therapeutic effect. Some areas of application of polyurethanes in medicine include joining of bones, peripheral nerves and internal organs (KL-3 adhesive) and treatment of vascular aneurisms. References 65: 15 Russian, 40 Western.  
[043-6508/13046]

# BIOMECHANICAL APPROACHES TO CREATION OF COMPOSITE ENDOPROSTHESES FOR SUPPORTING TISSUES

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IMENI D. I. MENDELEYEVA  
in Russian Vol 30, No 4, Jul-Aug 85, pp 428-438

YANSON, Kh. A., doctor of medical studies, Deputy Director, Latvian Scientific Research Institute of Traumatology and Orthopedics, and SAULGOZIS, Yu. Zh., candidate of technical sciences, Senior Scientific Fellow, Laboratory of Biomechanics, Institute of Polymer Mechanics, Latvian SSR Academy of Sciences, Riga

[Abstract] A study is reported of the design of new biological materials on the example of creation of an artificial substitute for human tubular bone. The entire process of planning and organizing the production of the endoprosthesis is flow-charted in four stages: determination of initial requirements, investigation of the chemical system involved, planning of the material and endoprosthesis, and organization of laboratory production. Carbon-fiber based composite materials in polymer matrices are suggested for replacement of bone. The design of accessory fittings is discussed. Additional problems which still must be solved are noted. Figures 10; references 111: 57 Russian, 64 Western.  
[043-6508/13046]

UDC 615.472:616.61-008.1-78

## POLYMER SELECTIVE MEMBRANES IN MEDICINE

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IMENI D. I. MENDELEYEVA  
in Russian Vol 30, No 4, Jul-Aug 85, pp 419-427

ELTSEFON, B. S., candidate of chemical sciences, Chief, Laboratory of Materials and Membranes for Hemodialysis, All-Union Scientific Research Institute of Medical Polymers, and DURGARYAN, S. G., candidate of chemical sciences, Chief, Laboratory of Synthesis of Selectively Permeable Polymers, Institute of Petrochemical Synthesis, USSR Academy of Sciences.

[Abstract] Practical successes have been achieved in the utilization of polymer membranes in extracorporeal circulation processes, including hemodialysis, hemofiltration, plasma filtration, and oxygenation of blood. The present demand for small, effective, sterile, apyrogenic hemodialyzers and blood oxygenators has reached 20 million units per year. Designs of such devices are described and illustrated. Polymers and membranes are useful in oxygen therapy. They are capable of transmitting large quantities of oxygen or oxygen-enriched air high in relative humidity while completely stopping the passage of harmful microorganisms, allowing persons with pulmonary insufficiency or pathology to be treated with moist air with very high oxygen content and excellent sterility. Figures 10; references 54: 28 Russian, 26 Western.  
[043-6508/13046]

## VACCINATION AGAINST MYOPIA

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 17 Oct 85 p 4

AVETISOV, E., professor, chairman of All-Union Association of Ophthalmologists

[Abstract] Myopia is a leading cause of handicap. Several factors are involved in development of myopia: overload of the accommodation apparatus, heredity, or weakening of the external eye membrane sclera. There are surgical procedures available to correct this defect, but they are complicated and basically restricted to children and teenagers. For this reason, a new procedure was developed at the Institute of Eye Diseases imeni Gelmgoltz: the scleroreinforcing injection. This procedure is based on injecting a special polymeric compound behind the eyeball which sets in a matter of few minutes, covering the rear wall of the eyeball. In addition to this strictly physical phenomenon, this polymer is replaced within 12 months by scleral tissue supporting and strengthening the rear wall of the eyeball. On about 150 patients, this procedure arrested progression of myopia.

[107-7813/13046]

## REVIVIFICATION

Moscow MOSKOVSKAYA PRAVDA in Russian 23 Oct 85 p 3

APN, Correspondent

[Abstract] The recently organized Institute of General Reanimatology, under direction of V. A. Negovskiy, concentrates on studies of the regulation of extinction of vital functions and possibilities of the reversal of these processes. Studies of revival of individuals go back to such simple interventions as artificial respiration. During the Second World War, this field received a significant boost when many attempts were made to revive soldiers clinically dead due to excessive loss of blood. Many factors are now recognized which could cause clinical death by old definitions (arrest of the heart beat and breathing), yet could result in revival if proper, timely procedures were applied. Current concepts of death are based on irreversible changes in the brain; even in this case a window of 4-6 minutes exists during which an organism may be brought back to functional life. Therefore, presently attention must be paid to prolongation of brain functions during emergencies. All hospitals, in fact all physicians, should be ready to perform revitalization procedures in emergency situations.

[138-7813/13046]

## SURGEON AND A ROBOT

Moscow SELSKAYA ZHIZN in Russian 4 Oct 85 p 4

NIKOLSKAYA, E.

[Abstract] Recently a licensing agreement was signed with the "Eurolens" company concerning a number of technological developments in microsurgical instrumentation for keratotomy treatment. This technology was developed at the Moscow Scientific Research Institute of Ocular Microsurgery under direction of Professor Svyatoslav Nikolayevich Fedorov, corresponding member, USSR Academy of Medical Sciences. Current microsurgery makes it possible to intervene in areas previously inaccessible to the surgeon. The principle developed at this Institute is based on a "conveyor belt" operation, where several surgeons perform limited steps in an overall operation, while the patient is being moved to another station virtually on a conveyor belt. This permits about 120 operations in an 8-hour shift. This obviously is a first step towards complete automation of this procedure. Even at this time, many of the determinations are being made by computer. The surgeon is providing only the fine touch in cutting to a certain depth. It is claimed that robots could do it just as well.

[100-7813/13046]

## PROGRESS IN NEUROENGINEERING

Moscow LENINSKOYE ZNAMYA in Russian 15 Sep 85 p 4

RYLOV, A., (candidate of medical sciences), Pushchino-Moscow

[Abstract] The principal studies in neuroengineering during recent years concerned the following problems: structural and functional relationship between implants and brain tissue; relationship of brain immune system to the invaders; potential of transplants to heal brain disease of animals modeling human problems. Almost all parts of embryonic brain tissue have already been transplanted to animals and half of them have survived through the entire life span of the test animal. The transplants matured, retained their original architecture, and even established interaction with the host-brain. It would appear that the transplants do not interfere with brain tissue. The problem of transplantation of neural cells has engaged the efforts of O. S. Vinogradov at the Institute of Biophysics, USSR Academy of Sciences; even though responding to various stimuli, the transplanted neurons assimilated the message system of the host. In an animal model, L. V. Poleshayev (Institute of General Genetics imeni Vavilov, USSR Academy of Sciences) has shown that transplantation of embryonic neurons led to slower death rate of injured brain cells, even in the neighboring hemispheres uninvolved in the experimental transplant. Other animal experiments are quoted, expressing the hope that eventually these experiments will lead to human neuroengineering goals.

[101-7813/13046]

SOVIET EYE SURGEON HONORED

Moscow VECHERNAYA MOSKVA in Russian 5 Sep 85 p 2

NIKOLSKAYA, E., NOVOSTI Press Agency

[Abstract] This article, titled "A Surgeon of the Federov School," reports presentation of the gold medal of VOIS [identified as the World Organization of Intellectual Ownership] to Professor E. V. Yegorova, an eye surgeon at the Moscow Institute of Microsurgery of the Eye. Professor Yegorova is cited for her work in cataract surgery, specifically in surgical treatment of traumatic cataracts by a modern version of an age-old approach to removing the clouded lens while preserving the natural capsule. This is achieved with microscopic surgery that enlarges the image of the operational field by 20-30 times. Professor Yegorova has written some 40 articles on the topic since defending her doctoral thesis on traumatic cataract treatment in 1979. They offer methods for removing damaged lenses and replacing them in the natural capsule with synthetic lenses. The Institute where she works is well known under the name of its director, Academician S. N. Fedorov. The high precision instruments used by Professor Yegorova are produced at the institute; the cutting edge of one is .12 mm in length. The surgery conducted by Yegorova may involve a "production line" of five surgeons working under lights so bright they throw no shadows, in operations that are planned using computer programs, for example, to select the precise replacement lens to be used.

[079-12131/13046]

UDC 578.833.26.083.224

SPECIFICS OF INFECTION OF CELL CULTURES WITH TICK-BORNE ENCEPHALITIS VIRUS  
WITH PERIODIC CHANGING OF CULTURE MEDIUM

Moscow VOPROSY VIRUSOLOGII in Russian No 2, Mar-Apr 85 (manuscript received  
23 Apr 84) pp 219-223

DZHIVANYAN, T. I., LISAK, V. M., LASHKEVICH, V. A. and KOROLEV, M. B.,  
Institute of Poliomyelitis and Viral Encephalitides, USSR Academy of Medical  
Sciences, Moscow

[Abstract] A study is made of the specifics of reproduction of the tick-borne encephalitis virus in swine embryo kidney cell culture with repeated changes of the viral supporting medium. Changes are demonstrated in the dynamics of appearance and accumulation of intracellular virus-specific proteins. The specifics of the morphology of the cells are described. An increase is determined in the summary yield of infectious virus in the cell culture under these conditions. Electron microscope studies indicate that when the medium is changed repeatedly, active proliferation of membrane endoplasmic reticulum elements occurs, with their transformation to a regularly organized system which in a relatively short period of time facilitates the formation of significant quantities of viable virus progeny. Figures 2; references 19: 3 Russian, 16 Western.  
[019-6508/13046]

UDC 576.5

MATHEMATICAL MODELS OF TRANSITIONAL PROCESSES IN MICROBIAL CHEMOSTAT CULTURES

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 19, No 3, May-Jun 85  
(manuscript received 11 Jan 84) pp 751-759

DROZDOV-TIKHOMIROV, L. N. and RAKHIMOVA, N. T., All-Union Scientific Research  
Institute of Genetics and Selection of Industrial Microorganisms, Moscow

[Abstract] Since the mathematical treatment of microbial growth curves proposed by Monod is applicable only to batch cultures, mathematical analysis was developed for growth under chemostat conditions. The model under investigation was a methanol-utilizing yeast culture, with the analysis involving measurements of enzyme levels (e.g., methanol oxidase), substrate

transport into cells, and regeneration of energy-donor molecules. The underlying assumption was that net protein synthesis is determined by the concentration of a few growth-limiting amino acids. The key factors leading to fluctuations in the rate of biomass accumulation with dilution were attributable to inducibility of methanol oxidase, the high intracellular concentration of methanol in relation to the Michaelis constant of methanol oxidase, and to the relatively slow rate of synthesis of methanol oxidase. Figures 5; references 13: 5 Russian, 8 Western.  
[124-12172/13046]

## MILITARY MEDICINE

### COMPUTERS IN MEDICINE

Moscow KRSNAYA ZVEZDA in Russian 22 Sep 85 p 4

SHTABTSOV, V., candidate of medical sciences, colonel, Medical Service

[Abstract] Information management in medicine requires reliance on computers, and the need for overcoming psychological barriers to working with computers has acquired top priority. In our experience the best approach is to train physicians and nurses in groups of 1-2 and 3-4, respectively, with provision for ample practice time. Familiarity with computers is becoming a prerequisite for successful medical practice, particularly in view of the increasing number of computer-assisted medical programs that are becoming available.

[105-12172/13046]



## MOLECULAR BIOLOGY

UDC 57.087

### COMPUTERS IN MOLECULAR BIOLOGY

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 19, No 1, Jan-Feb 85  
(manuscript received 15 May 84) pp 110-118

KAMINIR, L. B., Institute of Molecular Biology, USSR Academy of Sciences,  
Moscow

[Abstract] A cursory overview is presented of the use of data processing at the Institute of Molecular Biology of the USSR Academy of Sciences. Use is currently being made of mainframe and minicomputers, both of Soviet and foreign manufacture, and of Soviet and foreign software. The research problems in which data processing is being used extensively encompasses a variety of topics, including research on the structure and dynamics of nucleic acids, ESR analysis, and various other spectral and optical studies. Other areas of application are in modeling of intermolecular interactions, chromosomal analysis, and thin-layer electrophoretic and chromatographic analysis of radiolabeled compounds. Figures 3; references 53: 33 Russian, 20 Western.  
[94-12172/13046]

UDC 577.21

### IMMUNOGLOBULIN KAPPA CHAIN GENES: CLONING, HYBRIDIZATION AND STRUCTURAL ANALYSIS

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 19, No 1, Jan-Feb 85  
(manuscript received 28 May 84) pp 209-217

DEYEV, S. M., STEPCHENKO, A. G. and POLYANOVSKIY, O. L., Institute of  
Molecular Biology, USSR Academy of Sciences, Moscow

[Abstract] A review is provided of the research done at the Institute of Molecular Biology in the last few years on cloning, hybridization and structural analysis of kappa chain genes, using murine myelomas as a model system. Initial stages involved purification of mRNA, with best results achieved with an affinity adsorbent based on plasmid p8-1 containing the highly conservative 3'-untranslatable region and part of the constant region of kappa gene. Subsequently, standard biochemical and genetic engineering

technology was employed to attain enzymatic synthesis and cloning of double-stranded cDNA. The 'one clone - one antibody' hypothesis was further tested on myeloma MOPC-21 and hybridoma PTF.02 systems. The results indicated that at least in MOPC-21 one of the two allelic genes undergoes irregular rearrangement and cannot lead to the synthesis of a functional immunoglobulin chain. The original PTF.02 cells contained both the embryonic allele and the adult form; however, passage of these cells in mice resulted in loss of embryonic gene. In the case of B lymphocytes gene synthesis involves a feedback system in which an immunoglobulin functions as the stimulus, while the target is the Fc receptor on suppressor T cells. Figures 5; references 29: 8 Russian, 21 Western.  
[94-12172/13046]

UDC 577.212.175.3

#### GENETIC ENGINEERING OF PEPTIDE HORMONES

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 19, No 1, Jan-Feb 85  
(manuscript received 8 Jun 84) pp 267-277

RUBTSOV, P. M., CHERNOV, B. K., GORBULEV, V. G., PARADANYAN, A. Sh.,  
SVERDLOVA, P. S., CHUPEYEVA, V. V., GOLOVA, Yu. B., BATCHIKOVA, N. V.,  
ZHVIRBLIS, G. S., SKRYABIN, K. G. and BAYEV, A. A., Institute of Molecular  
Biology, USSR Academy of Sciences, Moscow

[Abstract] A minireview is provided of the research and achievements of the Functional Enzymology Laboratory of the Institute of Molecular Biology, USSR Academy of Sciences, in the genetic engineering of peptide and polypeptide hormones. Using standard technology and innovations suitable to the purpose at hand, a series of pituitary human and animal hormones have been produced that are of obvious medical and veterinary interest. More recent studies have resulted in the successful cloning of the human calcitonin gene. Of particular interest is the production of human growth hormone in an E. coli system with an unusually high yield of ca. 550,000 hormone molecules per cell. Figures 8; references 37: 7 Russian, 30 Western.  
[94-12172/13046]

UDC 577.217.5

#### SHINE-DALGARNO SEQUENCE AND EFFICIENCY OF TRANSLATION INITIATION

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 19, No 3, May-Jun 85  
(manuscript received 30 Dec 83) pp 702-716

KHUDYAKOV, Yu. Ye., Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow

[Abstract] An analysis was conducted on the relationship of the Shine-Dalgarno (SD) nucleotide sequence in mRNA to the initiation codon AUG and on

the efficiency of translation initiation in prokaryotic systems. To that end, detailed analyses were performed on the secondary structures of mRNA in the initiation region of attenuator peptides of phe-, trp-operons of *E. coli* and trp-operon of *Serratia marcescens*. Similar studies were undertaken on the initiator zones of hybrid mRNA molecules of plasmids pHGH, pCL, and pt, as well as on P1 and P2 transcripts of gal E-cistron of *E. coli*. Evaluation of the mRNA structures demonstrated that the region most accessible to recognition by ribosomes is that in which the nucleotide chain is in the form of an extended single-strand entity. The efficiency of formation of the single-strand region was in direct correlation with the efficiency of protein synthesis. In each case the SD segment is located in such a position and has such size as to favor single-strand segment formation following interaction of the 3'-end of the 16S rRNA of the 30S ribosomal subunit with the mRNA. Figures 6; references 49: 2 Russian, 47 Western.  
[124-12172/13046]

UDC 577.322

#### CONFORMATION OF GLYCOPEPTIDES WITH L- AND D-STEREoisomers OF Ala AND Glu

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 19, No 3, May-Jun 85  
(manuscript received 31 Jan 84) pp 730-741

MAKSUMOV, I. S. (deceased), ISMAILOVA, L. I. and GODZHAYEV, N. M.,  
Azerbaijan State University imeni S. M. Kirov, Baku

[Abstract] Since the biological activity of glycans and glycopeptides depends on the number and the manner of linkage of glucose residues, as well as on the stereochemistry of amino acids in the peptide portion, the synthesis of active preparations requires a full appreciation of these factors as they affect conformation. To that end, a semiempirical conformational analysis was conducted to assess factors contributing to a low-energy conformation of glycopeptides. The model glycopeptides under analysis had a glycan portion of O-beta-N-acetyl-D-glycosaminyl-(1-4)-N-acetyl-D-muramic acid or of O-beta-N-acetyl-D-muramic acid, and a peptide moiety consisting either of the dipeptides L-Ala-D-GluNH<sub>2</sub> or D-Ala-D-GluNH<sub>2</sub>. Analysis of the various shape and form factors in relation to bond angles and bond lengths demonstrated that the overall topographical or conformation features are predicated largely on the interaction of the dipeptide with muramic acid. Minimal activities were obtained with the L-Glu moiety in the molecule, but no definitive correlation was derived between activity and spatial form. Figures 5; references 44: 1 Russian, 43 Western.  
[124-12172/13046]

# INTRODUCTION OF ROUS SARCOMA VIRUS DNA SEQUENCES INTO MOUSE AND DROSOPHILA GENOMES BY MICROINJECTION INTO OVA

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 19, No 3, May-Jun 85  
(manuscript received 4 Jan 84) pp 760-766

GAZARYAN, K. G., GOLTISOV, V. A., NABIROCHKIN, S. D., ESHKIND, L. G.,  
TARANTUL, V. Z., GENING, L. V. and POPOV, L. S., Institute of Molecular  
Genetics, USSR Academy of Sciences, Moscow; Moscow State University imeni  
M. V. Lomonosov

[Abstract] Mouse and drosophila ova were employed as vehicles for the introduction of Rous sarcoma virus (RSV) DNA into the murine and fly genomes. Fertilized ova of C57BL/6 mice were treated with plasmide pPrC11 containing RSV DNA, and subsequently transplanted into BALB/C females with false pregnancies. Direct microinjection was employed in the case of *Drosophila melanogaster* ova. Southern blot analysis over several generations demonstrated integration of the RSV DNA into the mouse and fly genomes, and that the viral DNA sequences undergo rearrangement in the course of integration. RSV DNA was detectable in drosophila for some 30 generations, although the concentration was an order of magnitude less than in the 17th to 20th generations. In the case of one mouse ( $F_0$ ) and its progeny ( $F_1$ ), viral DNA was detectable in liver and brain cells in identical concentrations. Figures 3; references 25: 7 Russian, 18 Western.  
[124-12172/13046]

# ANALYSIS OF PRIMARY STRUCTURE OF E. COLI mRNA: FACTORS AFFECTING NUCLEOTIDES ON 3-PRIME-SIDE OF CODONS

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 19, No 3, May-Jun 85  
(manuscript received 6 Feb 84) pp 791-799

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[Abstract] A statistical analysis was conducted on nucleotide frequencies on the 3-prime-side of codons of strongly and weakly expressed genes to determine whether the efficiency of translation of codons other than the initiating and terminating codons are also dependent on such sequences in *E. coli*. The data showed that utilization of a number of codons in the strongly expressed genes depends on the nucleotide on the 3-prime-side. If the triplet following the lysine codon starts with guanosine, then lysine is more often coded for by the codon AAA than by AAG ( $P < 10^{-8}$ ). If, however, cytidine is present on the 3-prime-side, then the AAG codon is used more frequently than the AAA codon ( $P < 0.001$ ). Tabulated data are presented for a series of amino acids showing similar preference for one or another codon in relation to the nucleotide on the 3-prime-side. Figures 1, references 51: 1 Russian, 50 Western.  
[124-12172/13046]

## IDENTIFICATION OF BACTERIAL CLONES FOR BOVINE CASEINS BY DIRECT IMMUNOLOGIC SCREENING OF cDNA LIBRARY

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 19, No 4, Jul-Aug 85  
(manuscript received 14 Feb 84) pp 955-963

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[Abstract] In recent years, a cloning method for cDNA in the vector pBR 322 became popular for recognizing restrictase Ps + 1 located inside the  $\beta$ -lactamase gene. This method was used to select *Escherichia coli* clones containing hybrid plasmids with bovine casein gene sequences. Colonies grown on nitrocellulose filters were lysed in situ and proteins isolated from these lysates were blotted onto CNBr-activated filter paper, detecting the bound antigen by the reaction with antiserum to casein, followed by  $^{215}\text{I}$ -labeled protein A from *Staphylococcus aureus* and autoradiography. Out of 5,400 colonies tested in the gene library, four clones exhibited positive reactions; a1, b2, b5, and h7. Molecular weights of chimeric proteins of pre- $\beta$ -lactamase-casein which are synthesized in cells containing hybrid plasmids were determined. Colony hybridization and DNA sequence analysis showed that clone b5 contained the cDNA fragment of bovine  $\kappa$ -casein and clone h7 (designated pK cas  $\beta$ -7) contained cDNA fragment of  $\beta$ -casein. Thus, immunological methods used in clone selection identified bacterial clones whose plasmid DNA coded  $\beta$ -casein. This approach should be helpful in selection of clones corresponding to minor mRNA. Figures 6; references 23: 3 Russian, 20 Western.  
[126-7813/13046]

UDC 575.116.4:575.13

## MOLECULAR ORGANIZATION OF R906 (Inc P-1) PLASMID

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 19, No 4, Jul-Aug 85  
(manuscript received 20 Oct 83) pp 964-973

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[Abstract] Conjugative plasmid R906 (Inc P-1), determining resistance to ampicillin, streptomycin, sulfadimezine, and mercury salts was isolated from *Bordetella bronchiceptica* cells. In this work, genetic and physical analyses of R906 were carried out. Genetic and restriction maps (for enzymes EcoRI, Bom HI, and Hind III) were constructed. Two nonessential regions were identified, and they could be deleted without affecting any important functions. These segments contained resistance genes to antibiotics and restrictase splitting fragments. At the 0--23 and 29--44 kb fragments of the R906 chart,

the essential and conjugativity genes were located which, according to the Southern blot, showed a high level of homology with DNA of plasmids R751 and RP4 (Inc P-1). On the basis of heteroduplex analysis a transposon-like structure was identified with 5.1 kb length. No homologous sequences were noted for the Bla genes of plasmids R906 and RP4. It was shown that, regardless of the sources, the plasmids Mc P-1 have the same principle of molecular organization. Identical phenotypic markers in representatives of one group of noncompatibility does not necessarily represent structural similarity of genes coding such a marker. Figures 4; references 22: 5 Russian, 17 Western (1 by Russian authors).  
[126-7813/13046]

UDC 579.25.58

REACTION (INTEGRATION AND EXCISION) OF RPI DERIVATIVE - PLASMID pRP19.6 -  
CONTAINING DUPLICATED SEQUENCE IS21 WITH ESCHERICHIA COLI K12 CHROMOSOME

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 19, No 4, Jul-Aug 85  
(manuscript received 29 Mar 84) pp 1042-1052

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[Abstract] In earlier papers, isolation of plasmid pRP19.6 from a mutant RPlTs12 was reported with a characteristic property of making it possible to transfer chromosome genes of various gram-negative microorganisms. In the present paper, the reaction of this plasmid with E. coli K12 chromosome was investigated. The pRP19.6 insertion into the genome of the  $rec^+$  bacteria was reversible and its integration into the chromosome of  $recA^-$  bacteria produced stable Hfr strains. Analysis of the plasmids of R' transconjugates generated in the crosses between the stable Hfr and  $rec^+$  recipient showed that stable Hfr clones could produce stable RI plasmids along with a family of deletion derivatives of pRP19.6 --  $Km^8Tra^-$ . Considering the wide spectrum of the hosts of pRP19.6 and its ability to be inserted into various loci of bacterial genome, it was assumed that the thermally sensitive analogue R68.45 could be used for in vivo cloning (transfer) of chromosome genes from various gram-negative microorganisms. The use of stable Hfr strains, formed by insertion of pRP19.6, in production of deletion mutants  $Km^8Tra^-$ , is also of interest, since they could be used in studying genes assuring the transfer of plasmid as well as genes involved in replication of RPl. Figures 4; references 25: 7 Russian, 18 Western.  
[126-7813/13046]

FREQUENCIES OF NUCLEOTIDE OCCURRENCES ON 5-PRIME-SIDE OF CODONS IN  
ESCHERICHIA COLI GENES

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 19, No 4, Jul-Aug 85  
(manuscript received 16 Apr 84) pp 1086-1091

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[Abstract] An attempt was made to find statistical regulations of the occurrence of nucleotides from the 5'-side of codons and to generalize from them developing rules for the utilization of codon-synonyms in E. coli genes in relationship to nucleotides surrounding the condon. All nucleotide sequences were divided into strongly and weakly expressed genes. In strongly expressed genes there were 32 cases of nucleotide occurrence on the 5'-side from 61 aminoacid and terminal codons (a probability of random occurrence  $P < 0.01$ ). In the weakly expressed genes there were 15 such cases. Rules for predominant usage of condons-synonyms in strongly expressed genes were reported in relationship to the nucleotide on the 5'-side: if uridine is on the 5'-side of aspartic acid codon, then GAC predominates over GAU ( $P < 0.001$ ); with guanosine, however, GAU predominates over GAC ( $P < 10^{-4}$ ). These rules could be used in synthesis of genes designed to express E. coli. References 11: 3 Russian, 8 Western.  
[126-7813/13046]

RED GRAIN AND FUSARIOSIS

Moscow VOPROSY PITANIYA in Russian No 2, Mar-Apr 85 (manuscript received 20 Jan 84) pp 18-22

[E. V. Boltyanskaya and I. B. Kuvayeva, USSR Academy of Medical Sciences Institute of Nutrition Laboratory of Sanitary-Nutritive Microbiology and Microecology (headed by Dr of Biological Sciences I. B. Kuvayeva), Moscow: "Red Grain and Fusariosis"]

[Text] In collecting a harvest under conditions of a cold and rainy summer, grain-receiving points sometimes receive individual batches of grain in which there are kernels which have turned red (4, 6, 8).

The changed color of the grain is usually connected with bacterial or fungal infection. When grain is infected with microorganisms, especially microscopic fungi which form pigments, these penetrate into the grain, changing its color. Certain forms of fungi which develop in grain, along with pigments also form metabolites which are toxic for humans and animals--mycotoxins (1). Grain which is contaminated with mycotoxins can cause serious alimentary diseases if it is used for food or fodder purposes (10, 24). In connection with this, grain with a changed color should from the hygienic point of view be regarded as a potential danger for health. In resolving the question of ways to handle such grain it is necessary to discover the reason which caused the changed color in each specific case.

The appearance of red color in cereal grains is usually regarded as evidence of infestation by fungi of the *Fusarium* genus, individual representatives of which form a rose-red pigment. Various species of *Fusaria* are widespread in nature and are found both in soil and in various plants (1, 29, 39). They can develop in cereals during ripening, during collection of the harvest, transportation, storage, processing, and marketing. Fusarial grain, grain with signs of latent *Fusaria*, and grain seeded on the surface with *Fusaria* spores and mycelium but having no change in its properties differ in the nature of infestation by fungi from the *Fusarium* genus. Fusarial infestation is often caused not by a single species of this genus of fungi but by several species simultaneously. Conidial fruiting of these fungi is observed in the presence of overt *Fusaria*. Rose-red or raspberry-red coloring of the grain is considered a sign of latent *Fusaria*, as are wrinkling and swelling (4). When rose-colored and raspberry-colored grains infected with *Fusaria* appear, the mycelium of *Fusarium* is almost always observed. At the same time, the rose color can be a sign of other grain diseases of a parasitic (bacteriosis) and nonparasitic nature (4). In overt fusariosis and mixed bacterial-fusarial infection the grain can acquire a color from gray to almost black.



The main danger of *Fusaria* is that their infestation of grain can be toxic for humans and animals.

Various authors have reported on isolating fungi of the *Fusarium* genus from grains of various agricultural crops, especially wheat, barley, corn, and oats, to determine the toxic properties of the fungi (1, 21, 26-28, 34, 41, 42). Fungi of the *Fusarium* genus which develop in grain under laboratory conditions form a number of toxic metabolites depending on the species and strain of the fungus, including the mycotoxins zearalenone, 12, 13-epoxy-trichotecenes, and butenolide (21, 23, 34, 35).

The mycotoxin zearalenone (toxin F-2) has a marked estrogenic effect on animals. Its basic producers are *F. graminearum*, and also a number of other species of *Fusaria*, in particular *F. avenaceum*, *F. culmorum*, *F. gibbosum*, *F. lateritium*, and *F. tricinctum*. Zearalenone is found in a number of grain crops, especially corn, in many countries of Africa, Europe, and America (37, 40). The toxic effect on animals when fodder is contaminated has been described, but the effect of zearalenone on humans has not been reported.

Trichotecene toxins belong to a group of closely related chemical compounds produced not only by various species of fungi of the *Fusarium* genus, but also by fungi from *Cephalosporium*, *Myrothecium*, *Trichoderma*, and *Stachybotrys* genera. Fungi from the *Fusarium* genus produce about 40 biologically active trichotecene mycotoxins (18, 19, 22, 38). Species known to produce these are *F. poae*, *F. equiseti*, *F. lateritium*, *F. nivale*, *F. oxysporum*, *F. rigidiseulum*, *F. solani*, *F. roseum*, *F. tricinctum*, and others. Under natural conditions, four trichotecene mycotoxins are found in grain crops, predominantly corn and barley. These include the T-2 toxin, nivalenol, deoxynivalenol, and diacetoxyscirpenol; moreover, trichotecenes are usually present simultaneously with zearalenone (25, 30, 32, 33, 43). The remaining mycotoxins were obtained under laboratory conditions in cultivating toxigenic strains of various *Fusaria* species on various nutritive substrates.

In the opinion of a number of authors, fusarial toxins are a more important problem for field crops than aflatoxins, because of the wide distribution of toxigenic strains of *Fusarium* in the grain of staple agricultural crops and fodders (31).

Two well-known human diseases are connected with grain products infested with *Fusarium* fungi. One of them got the name "temulent corn." It arose through using toxic grain infested with *F. graminearum* fungus in human food. The disease was described by N. A. Polchevskiy in 1882 in the Far East, and studied by M. V. Voronin and other Soviet scientists. The operative principle in this disease turned out to be choline, or its ester, acetylcholine.

The second disease, alimentary toxic aleukia (ATA), was caused by using in food products grain which had spent the winter under snow. Cases of the disease were observed in the USSR in 1932, and then during World War II. As a result of extensive integrated research done by collectives of a number of scientific-research institutes, it was established that the etiology of ATA is connected with infestation by toxigenic strains of *F. sporotrichiella* fungi (11-17). In grain infested by *F. sporotrichiella* (var. *sporotrichioides* and

var. *poae*), an accumulation of toxic lipids was discovered, one of which--lipotoxol--was isolated by I. Ye. Olifson. Sporofusarin and other toxic sterols were separated from ethanol-chloroform extracts of defatted grain infested with various varieties of *F. sporotrichiella* (1).

Since there were no more cases of ATA after the end of World War II, this disease ceased attracting the attention of researchers. Research began again in the 1970's after the isolation and chemical identification of a fusarial toxin of the trichocetene type (T-2 toxin), which causes isolated ATA symptoms in cats. But convincing evidence has still not been obtained for the connection between trichocetene mycotoxins, including the T-2 toxin, with ATA or other human diseases.

In recent years reports have continued to come out on the infestation of grain by toxigenic fungi from the *Fusarium* genus and the appearance of a red color and toxic properties in the grain in a number of cases when this occurs. In the 1980's an outbreak of fusarial infestation of grain was observed in Canada. Vomitoxin was discovered in samples of this red-colored grain (42). The grain caused poisoning in pigs and domestic birds. The fungi *F. graminearum* and *F. poae*, which produce vomitoxin in vitro, were isolated from wheat.

In studying grain which had spent the winter under snow (corn, barley, wheat), collected in various regions of Canada, fungi from the *Fusarium* genus were discovered in 37 percent of the samples. Under laboratory conditions, 12 of the 38 strains isolated synthesized trichotecene mycotoxins, T-2 toxin (*F. sporotrichoides*), HT-2 toxin, neosolaniol, dicetoxyscirpenol (*F. poae*). Certain strains produced zearalenone (36).

Taking into account the serious danger that fusarial grain presents for the health of humans and animals, organs of health care and veterinary supervision in the USSR manifest constant concern for the quality of grain which goes to fill food needs and cattle fodder. Because of this, procurement points traditionally regard red color in grain as a sign of its infestation with toxigenic species of fungi of the *Fusarium* genus. At the same time, there is information that in freshly harvested wheat and rye it is possible to encounter normally filled-out grains with rose- or raspberry colored envelopes, which are distinct from those infested with *Fusaria* (6).

In contrast to overt fusarial grain these red grains are not substantially different from normal-colored grains in their basic biochemical and technological indicators, and also in their mycobiocenosis. Red grains have a high vitality, high-germination rate, and high-sprouting energy. In biological experiments on pigeons, no toxic properties were discovered for red grains (7). In mycological analysis, fungi of the *Fusarium* genus were separated unsystematically both from red grains and normal-colored grains of a batch of grain having suspicious color. Based on all these data, it was concluded that the red color of grain in the research samples was caused by reasons other than fusariosis. Different microorganisms, particularly bacteria but also fungi, not related to *Fusaria* were indicated as the agents causing the red-dening of grain (8, 9).

The opinion was expressed that the formation of red pigment in the reddening of grain by these microorganisms was not connected with the formation of toxins.

The greatest attention was attracted by sterile Ordin mycelium (8), which was isolated using a micromanipulator from envelopes of red grain and obtained in pure culture. It was not possible to establish the species to which this fungus belonged, since despite the various conditions of cultivation, it did not form conidia or other organs of multiplication, remaining a sterile mycelium. In conventional nutritive media, sterile mycelium has a grey color and often does not form any pigment. It forms a brick-red pigment on Chapek agar with glucose. A distinguishing characteristic of sterile mycelium is its slow growth. On the strength of this, the authors believe that when red grain is placed in nutrient media the sterile mycelium is suppressed by other rapid-growing fungi and does not stand out, and if it does grow, it remains negligible among the mycelia of other fungi.

Because of the difficulty of isolating sterile Ordin mycelium from grain and cultivating it under laboratory conditions, its biology, systematics, and ability to produce toxic metabolites are still not clear. There are no data on its distribution in various regions in natural grain, and its ability to cause grain contamination has not been proved in experiment.

It should be noted that in all the research carried out the grain studied was obtained from grain-receiving points, after collection of the harvest. Because of this, the impression was created that the red color appears in grain during unfavorable conditions of harvesting and storing it in the post-harvest period. To clear up the question of at which stage of grain production the reddening occurs, we studied grain samples collected directly in the field before gathering of the harvest (2, 5). It was discovered that the red color in grain appears even while it is ripening in the field. Mycological analysis of this immature grain showed that in ears containing red grains, a significant portion (up to 44 percent) of both red and normal-colored grains are grown over with colonies of *Fusaria* when put into nutrient media. When the grain was stored in the laboratory, its level of infestation with fungi of the *Fusarium* genus was observed to decrease--that is, self-purification of the grain was observed.

A number of strains of *Fusaria* separated from red grain, in experimental infestation of normal-colored sterile grain, caused it to redden on the second or third day, while the airborne mycelium was still quite poorly developed. It is possible that reddening of grain is caused not only by *Fusaria* but also by sterile Ordin mycelium. Thus, the reason for the red color in some cases would be connected with the reddening of grain by *Fusaria*, and in others with the infection by sterile Ordin mycelia, and in a third group of cases with combined infection of these and other fungi.

From the hygienic point of view, two questions are of interest--namely, how to distinguish fusarial red grain from nonfusarial, and also the degree of toxicity (or harmlessness) of nonfusarial red grain for people and animals.

Using mycological analysis for these purposes cannot always be successful. Sterile Ordin mycelium usually does not appear when the grain is put in nutrient media, while fungi of the *Fusarium* genus, turning the grain red as it grows in the field, can lose their vitality for a number of reasons in the process of harvesting and during the post-harvest period, for example, if the moisture content of the grain is reduced, and for this reason they show up irregularly and in insubstantial quantities.

The use of chemical and physical-chemical methods to discover fusarial toxins in grain has its limitations, since these methods require complex and expensive equipment, and are strictly specific (20). They only make it possible to discover toxic fungal metabolites with strictly specific chemical properties.

Biological methods are used in practice to resolve the question of the harmlessness of grain, including alimentary experiments on laboratory animals, and also as an additional test, *Saccharomyces fragilis* yeast 25D which is sensitive to fusarial toxins is used to discover toxins of fungi of the *Fusarium* genus in grain (3). But experiments on animals are long and labor-intensive. Because of this, it is necessary to continue searching for new rapid, simple-to-carry-out, and effective methods of controlling the quality of grain.

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CSO: 1840/71

## TOXICOLOGICAL CHARACTERISTICS OF ACUTE AND SUBACUTE T-2 MYCOTOXICOSES IN MICE

Moscow VOPROSY PITANIYA in Russian No 3, May-Jun 85 (manuscript received 8 Jun 84) pp 59-62

[Article by A. B. Levitskaya, L. I. Avrenyeva, and V. A. Tutelyan, Laboratory of Enzymology, Institute of Nutrition, USSR Academy of Medical Sciences, Moscow]

[Text] A study of the toxin-forming ability of a number of strains of the *Fusarium* microscopic fungi that are broadly distributed in the USSR has made it possible to establish that many of these strains are producers of the T-2 toxin which is one of the highly toxic metabolites that belongs to the group of trichothecin mycotoxins, and that is frequently detected in food products. The danger that the T-2 toxin poses for human and agricultural animal health is associated with its deleterious effects on hemopoietic and immunity-competent organs [11-13, 21-23] as well as its embryotoxic and teratogenic properties [3, 15], and has made it necessary to find methodological approaches for evaluating the toxic effects of this metabolite that might be used for the substantiated control of T-2 toxin in food products.

The experiments were conducted on male mice CBA X C57BL/6 whose initial weight was 18 - 20 grams. The animals were given a fully adequate common vivarium diet and water ad libitum. T-2 toxin was isolated from grain infected by *Fusarium sporotrichiella* strain 53315 [9]. The authors extend their gratitude to associate of the Enzymology Laboratory of the USSR Academy of Medical Sciences Institute of Nutrition V. S. Sobolev for making available a crystalline preparation of the T-2 toxin. Single injections of a solution of crystalline T-2 toxin was given intragastrically at doses of 2, 4, 6, 8, 10, and 12 mg per 1 kg of body weight in order to determine the LD<sub>50</sub> for the mice. The average lethal dose of the toxin was calculated by the G. Karber method [17]. The experiment was conducted on five groups of animals. The mice of the first group were given a single injection of the T-2 toxin at the LD<sub>50</sub> dose of 6.75 mg/kg. The second group was given a daily dose at 1/5 LD<sub>50</sub> (1.36 mg/kg) for seven days. The third group was given a dose at 1/10 LD<sub>50</sub> (0.67 mg/kg) for 14 days. The fourth group was given a dose at 1/20 LD<sub>50</sub> (0.34 mg/kg) (30 days), and the fifth group was given 1/50 LD<sub>50</sub> dose (0.13 mg/kg) for 75 days. The total amount of toxin received by the animals of each group was the same, which amounted to 9.69 mg per 1 kg of body weight. The control animals were given the same amount

of a solvent -- a 1% aqueous solution of ethanol computed on the basis of 0.4 ml per 25 grams of body weight. Throughout the entire period of the observation, blood was removed from the caudal vein to determine the concentration of hemoglobin, total erythrocyte count, leukocytes, and differential blood count [7, 10]. The mice were killed 24 hours after the last injection of the toxin. The total activity of four organello-specific enzymes were assayed in hepatic homogenates prepared under standard conditions. Those enzymes were lysosome aryl sulfatases A and B (KF 3.1.6.1), mitochondrial succinate dehydrogenase (KF 1.3.99.1), microsome glucose-6-phosphatase (KF 3.1.3.9), and the enzyme of plasma membranes -- alkaline phosphatase (KF 3.1.3.1). Enzyme activity was determined by spectrophotometric methods based on the use of the A. A. Pokrovskiy ultramicro system of biochemical analysis [6]. Alkaline phosphatase activity and lysozyme concentration (KF 3.2.1.17) was determined by the R. Parry et al. method with our modifications [19]. Protein content was assayed by the method of O. Lowry and coauthors [18].

The basic symptoms of intoxication following a single injection of the T-2 toxin in the mice were matted hair, adynamia, dyspnea, diarrhea, inflammation of the nasal mucous membranes with secretion of a hemorrhagic exudate, hypothermia, and tremor. The time of the clinical symptoms' appearance and their intensity depended on the dose of the toxin. The computed average lethal dose of T-2 toxin after 72 hours was 6.75 mg per 1 kg of body weight, which is practically the same as that cited in the literature [25, 26]. When a single injection of the toxin was administered at the LD<sub>50</sub> dose or at 1/5 LD<sub>50</sub> for a period of seven days, the toxicosis picture did not differ from the one described above. Thirty percent of the animals in both groups perished by the end of the experiment. In addition, the body weight of the mice which received the toxin at a dose of 1/5 LD<sub>50</sub> decreased reliably and, by the end of the experiment, came to  $18.0 \pm 0.6$  grams as opposed to  $22.3 \pm 0.3$  grams for the control animals.

When the mice were given the T-2 toxin at a dose of 1/10 LD<sub>50</sub>, the basic symptoms of intoxication included rumpling of the hair, adynamia, and some weight loss by the end of the experiment (94 percent of the control). Prolonged injection of the toxin at doses of less than 1/10 LD<sub>50</sub> (1/20, 1/50 LD<sub>50</sub>) was not accompanied by the development of clinical symptoms of intoxication. Nevertheless, in the mice injected with T-2 toxin at doses exceeding 1/20 LD<sub>50</sub> (LD<sub>50</sub>, 1/5, 1/10 LD<sub>50</sub>), we noted an increase in the relative mass of the liver, a tendency towards a reduction in the relative mass of the spleen, and a significant decrease (by almost one-half) in the mass of the thymus.

Warranting particular attention are the changes in the hematological indices (Table 1). Thus, injections of T-2 toxin to mice at doses of 1/5 - 1/20 LD<sub>50</sub> caused a reliable decrease in hemoglobin concentration, total erythrocyte count, leukocyte count as well as a decrease in the relative and absolute number of lymphocytes by the end of the experiment.



Table 1. Change in the Hematological Indices in Mice During Intoxication by Various Doses of T-2 Toxin

1 Показатели	2 Группа животных					
	3-я		4-я		5-я	
	7 дней	14 дней	7 дней	30 дней	60 дней	75 дней
12 Гемоглобин, г/л	151±3,3*** 165±4,0	172±1,9*** 179±2,1	165±6,0 165±4,0	168±6,6*** 184±4,9	164±2,5 173±3,5	167±4,2 176±3,5
13 Эритроциты, 10 <sup>12</sup> /л	7,6±0,6** 8,3±0,1	6,2±0,6** 8,2±0,2	8,2±0,1 8,3±0,1	8,0±0,1 8,6±0,3	5,7±0,5 7,8±0,4	6,7±0,4 6,9±0,2
14 Лейкоциты, 10 <sup>9</sup> /л	4,6±0,6* 8,9±0,1	9,3±0,5 11,3±1,1	8,3±0,6 8,9±0,1	10,3±0,3* 14,9±0,7	6,3±0,9** 10,5±0,8	11,6±0,9 11,9±0,9
15 Лимфоциты, 10 <sup>9</sup> /л	2,7±0,4** 5,7±0,7	6,6±0,5 8,1±0,7	4,7±0,4 5,7±0,7	7,7±0,3* 13,1±0,2	3,7±0,1* 7,4±0,4	6,8±0,7** 9,9±0,7

6 Примечание. Здесь и в табл. 2 представлены средние данные ( $M \pm m$ ) из 6 опытов; числитель — опыт, знаменатель — контроль; звездочками отмечены величины, статистически достоверно отличающиеся от контроля: одна звездочка —  $p < 0,001$ , две —  $p < 0,01$ , три —  $p < 0,05$ .

Key:

1. Indices
2. Group of animals
3. 2nd
4. 3rd
5. 4th
6. 5th
7. 7 days
8. 14 days
9. 30 days
10. 60 days
11. 75 days
12. Hemoglobin, g/l
13. Erythrocytes, 10<sup>12</sup>/l
14. Leukocytes, 10<sup>9</sup>/l
15. Lymphocytes, 10<sup>9</sup>/l
16. Remarks. Here and in Table 2 the average data ( $M + m$ ) are given for six tests; the numerator is the test, the denominator is the control; the asterisks denote values that statistically differ from the control: one asterisk —  $p < 0.001$ , two asterisks —  $p < 0.01$ ; and three asterisks —  $p < 0.05$ .

When the T-2 toxin was administered at a dose of  $1/50 \text{ LD}_{50}$ , the absolute and relative number of lymphocytes decreased by the 30th day, and by the 60th day, there was also a reliable decrease in the total number of erythrocytes and leukocytes. In spite of the fact that the total erythrocyte and leukocyte count was restored to the original level by the 75th day of the toxin's injection, the absolute and relative number of lymphocytes remained at the reduced level. An analysis of the differential ~~neutrophils~~ end of the experiment there was an increase in the absolute (up to 113 - 178%) and relative (up to 127 - 199%) number of the nuclear-segmental forms of neutrophils, with the exception of the group that received the T-2 toxin at a dose of  $1/5 \text{ LD}_{50}$ . The changes in the total number of leukocytes in the peripheral blood are closely correlated to the changes in blood serum lysozyme concentration, i.e., a reduction in the total number of leukocytes was accompanied by a reduction in lysozyme concentration (see diagram).

A study of enzyme activity in the mice liver showed that the injected toxin did not cause pronounced changes in the activity of organelle-specific enzymes in a single one of the experimental groups. Only high doses of the toxin that were equal to the  $\text{LD}_{50}$  led to reliable reduction in the activity of lysosome aryl sulfatases A and B (Table 2). At the same time, there was a persistent reduction of alkaline phosphatase activity and lysozyme concentration in the blood serum (see diagram). Blood serum and hepatic protein content was reduced at all of the tested injection doses, except the dose of  $1/50 \text{ LD}_{50}$ .

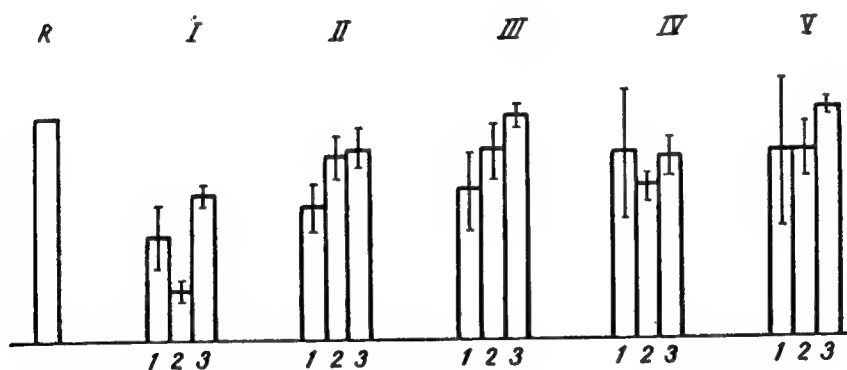


Diagram 1. Alkaline Phosphatase Activity (1), Lysozyme Concentration (2), and Protein Content (3) in the Blood Serum of Mice Given Various Doses of T-2 Toxin (in % of the control, taken as 100)  
K - Control, I - V - groups of animals. Confidence limits computed as 2 tm at  $p=0.05$ .

Thus, the daily administration of various doses of toxin to the mice at an identical total dosage level has enabled us to identify variable degrees of clinical intoxication, i.e., a clearly pronounced degree of intoxication at doses of  $LD_{50}$  and  $1/5 LD_{50}$ , to an asymptomatic clinical picture at doses of  $1/20 - 1/50 LD_{50}$ . The changes in hematological indices in the present study that are characterized by a persistent reduction in total leukocyte count as well as a relative and absolute reduction in the number of lymphocytes are in good agreement with numerous findings in the literature [11 - 13, 22] and are associated with the capability of T-2 toxin to proliferate red bone marrow cells, the cells of the spleen, thymus, and lymph nodes [12, 13, 21]. One should emphasize, in this connection, that the development of leukopenia in some species of animals is a characteristic symptom of intoxication not only by the T-2 toxin, but by other representatives of the trichothecin group of the mycotoxins [23].

We know that T-2 toxin has a pronounced inhibitory effect on protein synthesis [16]. Apparently, this is one of the basic reasons for the reduced lysosome enzyme activity in the liver during acute T-2 toxicosis. We obtained similar results in previous investigations in which we studied acute intoxication by T-2 toxin in rats, although the reduced lysosome enzyme activity was more pronounced in rats [5].

A persistent reduction in lysozyme concentration and alkaline phosphatase activity in blood serum was a characteristic feature of both acute and subacute T-2 toxicosis in mice. Based on present-day notions to the effect that lysozyme is one of the factors that elevate an organism's natural resistance, and that lysozyme is manufactured by leukocytes and released when the latter become old and are destroyed [1, 2, 14], one could assume that the reduction in lysozyme concentration is associated with leukopoiesis as a consequence of the damage caused to proliferative red bone marrow cells by T-2 toxin [12, 13, 21]. The pronounced reduction in the activity of alkaline phosphatase in the blood serum, which is in agreement with the results of our studies on rats, is apparently associated with the high degree of sensitivity to T-2 toxin exhibited by small intestine epithelial cells which constitute one of the principal sources of this enzyme [20]. Our data coincide with the research results of a number of authors who have conducted such studies on various species of animals [8, 24]. It should be noted that similar changes in enzyme activity were observed not only during the injection of purified toxin, but also of grain infected by the toxin-producing strain of *F. sporotrichiella* [4].

Table 2. Activity of Organelle-Specific Enzymes (in micromoles in 1 min per 1 gram of tissue) in Mouse Liver During Acute and Subacute Intoxication by Various Doses of T-2 Toxin

① Ферменты	② Группа животных				
	1-я ③	2-я ④	3-я ⑤	4-я ⑥	5-я ⑦
Арилсульфатазы А и В ⑧	$0,62 \pm 0,02^*$ $0,78 \pm 0,01$	$1,04 \pm 0,05$ $0,91 \pm 0,05$	$0,98 \pm 0,05$ $0,93 \pm 0,03$	$0,83 \pm 0,08$ $0,78 \pm 0,01$	$1,23 \pm 0,07$ $1,21 \pm 0,08$
Сукцинатдегидрогеназа ⑨	$1,33 \pm 0,15$ $1,12 \pm 0,09$	$1,33 \pm 0,02$ $1,31 \pm 0,09$	$1,86 \pm 0,11$ $1,56 \pm 0,16$	$1,28 \pm 0,08$ $1,12 \pm 0,09$	$1,31 \pm 0,06$ $1,31 \pm 0,09$
Глюкозо-6-фосфатаза ⑩	$2,97 \pm 0,15$ $3,21 \pm 0,04$	$3,30 \pm 0,09$ $2,95 \pm 0,14$	$3,24 \pm 0,14$ $3,12 \pm 0,16$	$3,38 \pm 0,06$ $3,21 \pm 0,04$	$3,40 \pm 0,06$ $3,31 \pm 0,06$
Щелочная фосфатаза ⑪	$0,19 \pm 0,02$ $0,17 \pm 0,01$	$0,19 \pm 0,01$ $0,17 \pm 0,01$	$0,20 \pm 0,01$ $0,19 \pm 0,01$	$0,19 \pm 0,02$ $0,17 \pm 0,01$	$0,22 \pm 0,01$ $0,21 \pm 0,01$
Белок, мг на 1 г ткани ⑫	$167,2 \pm 4,1^{***}$ $182,0 \pm 3,6$	$182,8 \pm 2,8^{**}$ $205,7 \pm 5,6$	$177,4 \pm 1,7^{***}$ $191,4 \pm 5,7$	$174,9 \pm 1,3$ $182,0 \pm 3,6$	$211,2 \pm 6,4$ $211,9 \pm 3,4$

Key:

1. Enzymes
2. Group of animals
3. First
4. Second
5. Third
6. Fourth
7. Fifth
8. Aryl sulfatases A and B
9. Succinate dehydrogenase
10. Glucose-6-phosphatase
11. Alkaline phosphatase
12. Protein, mg per 1 gram of tissue

Thus, the results of the present work indicate that a prolonged administration of T-2 toxin at low doses ( $1/50 \text{ LD}_{50}$  -- 0.135 mg per 1 kg of body weight) can lead to marked lymphopenia, a reduction in lysozyme concentration and alkaline phosphatase activity in the blood serum in the absence of any clinical manifestations. The methodological approaches we have selected for evaluating a subacute intoxication by T-2 toxin can apparently be used to substantiate the regulation and control of T-2 toxin in food products.

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CSO: 1840/073

## POLYMERS WITH CONTROLLABLE BIODEGRADABILITY AS CARRIERS FOR BIOLOGICALLY ACTIVE SUBSTANCES

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IMENI D. I. MENDELEYEVA  
in Russian Vol 30, No 4, Jul-Aug 85, pp 372-378

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[Abstract] A discussion is presented of some results on the synthesis of new types of medications capable of directed transport in the body. The construction of soluble polymer carriers with structure which can be systematically altered as a function of the task at hand is seen as the solution to a number of problems related to the control of biodegradability and the influence of polymer carrier structure on biological activity and determination of expedient means of transporting medications to desired tissues, as well as questions of the immunologic properties of polymer carriers for medications. Studies were performed on copolymers of N-(2-hydroxypropyl) methacrylamide (OPMA) to which oligopeptide sequences convenient for attachment of medications and specific determinants could be added. The biological properties of polymer plus carrier conjugates with biologically-active substances were not analyzed in detail. The results of the studies indicate the possibility of synthesis, on order, of polymer medications with predetermined structure and related biological properties, corresponding to specific conditions under which the medications can be utilized. Figures 5; references 73: 5 Russian, 68 Western.

[043-6508/13046]

## MACROMOLECULAR DRUGS IN CARDIOLOGY

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IMENI D. I. MENDELEYEVA  
in Russian Vol 30, No 4, Jul-Aug 85, pp 365-372

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[Abstract] Recently, physiologically-active natural compounds such as enzymes, hormones, prostaglandins, have been increasingly employed as medications. In order to take advantage of the greater specificity of these compounds, natural biologically-active compounds should be used whenever possible and, when synthetic compounds with greater toxicity, tendency to cause fever, antigen problems, etc., must be used, side effects should be minimized. This article discusses approaches to and methods of improvement of medications of this nature. Presently known medications can be used to create new preparations with higher effectiveness, allowing simpler methods of treatment. New generations of macromolecular derivatives of thrombolytic enzymes include medications which are stabilized by modification of biologically-active macromolecules and possibly additional biologically-active, low-molecular-weight compounds, yielding preparations with a spectrum of therapeutic activities; thrombolytic enzymes modified by compounds having elevated affinity to thrombus components so that spontaneous concentration of the preparation in the affected zone is achieved; and enzymes bonded to microparticles of complex structure containing finely dispersed ferromagnetic material which can be concentrated at the assigned location under the influence of an external magnetic field. Urokinase modified with heparin or fibrinogen are given as examples. One means of delivering medications to the desired area involves addition of microscopic particles of ferromagnetic materials and application of an external magnetic field to concentrate them in the desired location where the therapeutic agent is liberated, thus creating a high local concentration. In one study, finely dispersed ferromagnetic particles were used to 'coat' starch which was then activated by ordinary methods and radioactively-labeled protein was immobilized on its surface. The protein was then concentrated in an area to which a magnetic field was applied. Dextrans can also be used as a coating for magnetically-sensitive materials, then activated by partial oxidation. This material is a convenient carrier for the production of macromolecular derivatives such as thrombolytic enzymes. References 50: 15 Russian, 35 Western.  
[043-6508/13046]



## MACROMOLECULAR ANTIMICROBIALS AND MEDICATIONS

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IMENI D. I. MENDELEYEVA  
in Russian Vol 30, No 4, Jul-Aug 85, pp 378-386

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[Abstract] Certain natural cationic proteins, polypeptides and their synthetic analogs, as well as water-soluble cationic polyelectrolytes obtained from amino acids and monomers, which do not in themselves have any antimicrobial activity, form a special class of macromolecules with antimicrobial activity. The modes of action of these macromolecules are discussed. A combination of high enzymatic activity with elevated capacity to bond with living cells form a direct path for the synthesis of highly effective antibacterial substances in order to increase the activity of antibiotics with respect to resistant strains of pathogenic microorganisms. In an experiment involving combined polymer medications, a good therapeutic effect was achieved with 0.5% solution of the polymer complex for the treatment of microbially contaminated wounds in the skin and muscle tissue. Figures 1; references 93: 47 Russian, 46 Western.  
[043-6508/13046]

## CAUTION IN ACCEPTANCE OF MIRACULOUS DRUGS

Moscow ZHURNALIST in Russian No 8, Aug 85 pp 28-30

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[Abstract] This is a report of an interview with Georgiy Rudenko, Chief Scientist, Secretary of the Pharmacology Committee of USSR Ministry of Health, WHO expert, doctor of medical sciences, concerning nonaccepted drugs being advocated by unknown discoverers. The first question concerned the chain of events leading to approval of a new drug, which consists of three parts: preclinical investigation on animals (only one out of 10,000 synthesized agents qualifies for further evaluation); the second stage begins after a candidate reaches the Pharm-Committee which then decides whether to proceed with further work, based on the experimental data; in this fashion, nobody could influence the course of further work. The third step considers safety, efficacy, and advantages over the existing drugs. It takes anywhere from 8 to 10 years to bring a new drug from its discovery to the market. Very often premature data are released on new drugs, preventing proper patenting, especially when unscrupulous journalists embellish upon the claims. An appeal is made: journalists should follow one commandment: "do not lie." Their reports should not be based on sensationalism but on hard facts; this article suggests that, unfortunately, in the USSR this is apparently not the case.  
[119-7813/13046]

## GEROPROTECTIVE ACTIVITY OF 2,6-DIMETHYL-3,5-DIETHOXYCARBONYL-1,4-DIHYDROPYRIDINE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 284, No 5, Oct 85  
(manuscript received 5 Jun 85) pp 1271-1274

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[Abstract] Antioxidants are the most studied geroprotectors, i.e., compounds extending life expectancy of animals. Derivatives of 1,4-dihydropyridine (1,4-DHP) with electron accepting substituents at positions 3 and 5 could be viewed as analogues of the reduced forms of natural redox coenzymes. Geroprotective properties of 2,6-dimethyl-3,5-diethoxycarbonyl-1,4-DHP (I) were studied on C3HA mice and drosophila D-32. The unique property of I is that it is nontoxic; as a matter of fact, its DL<sub>50</sub> could not be determined. It was shown that administration of I to test mice with food (175 mg/kg body weight), starting at 9 months of age increased significantly their average life span; analogous results were observed on drosophila when 0.1% solution of I was added to the culture medium. The effect on mice was seen in animals entering their "second" half of life. The effect on drosophila was stronger, the earlier the exposure of test animals to I. Figures 1; references 14 (Russian).  
[113-7813/13046]

UDC 615.849.1.015.25].015.2:615.31:547.963.3

## INTERACTION OF DNA WITH INDOLYLALKYLAMINE RADIOPROTECTIVE AGENTS

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 19, No 9, Sep 85  
(manuscript received 14 Sep 84) pp 1051-1054

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[Abstract] In order to determine a relationship between radioprotective efficacy of indolylalkylamines and interaction with DNA, binding studies were conducted with sturgeon milt DNA and serotonin and 4,5-, 6,7-, and 5,6-benztryptamine. Binding was followed from changes in UV fluorescence spectra, circular dichroism, and elution patterns from a Sephadex G-75 column. The binding constant for serotonin was  $3 \times 10^3 \text{ M}^{-1}$ , and for 4,5- and 5,6-benztryptamine  $2 \times 10^5 \text{ M}^{-1}$ . DNA did not bind 6,7-benztryptamine; in addition, denaturation of DNA by boiling also abolished binding. These observations were interesting from the viewpoint that both 4,5- and 5,6-benztryptamine exert radioprotective effects, while 6,7-benztryptamine fails to do so. Although binding was firmer with the 4,5-congener than with the

5,6-molecule, neither was bound firmly, and binding did not exceed 60% of the molecules. In the case of serotonin, binding was less than 40%. Figures 5; references 8: 3 Russian, 5 Western.  
[143-12172/13046]

UDC 615.213.012.1.07

SYNTHESIS AND PHARMACOLOGIC ACTIVITIES OF SUBSTITUTED 2-AMINOMETHYL-4H-[1]BENZOTHIOPYRANO[3,4-d]IMIDAZOL-4-ONES

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 19, No 9, Sep 85  
(manuscript received 17 Oct 84) pp 1057-1060

SAVELYEV, V. L., PRYANISHNIKOVA, N. T., AFANASYEVA, I. V., CHERNYAKOVA, I. V., TROITSKAYA, V. S. and ZAGOREVSKIY, V. A., Scientific Research Institute of Pharmacology, USSR Academy of Medical Sciences, Moscow

[Abstract] Previous undescribed 2-aminomethyl-4H[1]benzothiopyrano[3,4-d]-imidazol-4-ones (I) were synthesized to investigate their potential pharmacologic action. Synthesis commenced with the reaction of 4-(N-R-amino)-3-aminothiocoumarins with chloroacetyl chloride to give 1-R-2-chloromethyl-4H[1]benzothiopyrano[3,4-d]imidazole-4-ones (II). In subsequent steps the II compounds were reacted with selected amines to give I compounds. Studies on albino mice showed that I compounds had LD<sub>50</sub> values of 100-1000 mg/kg. The agents were entirely innocuous in doses of 1/10th LD<sub>50</sub>, exerting a depriming-type of neurotropic activity. The latter property was largely dependent on the radicals on the nitrogen atom and the methylene group. Highest neurotropic activity was exhibited by agents with the piperidine moiety. References 2 (Russian).  
[143-12172/13046]

UDC 615.356:[577.161.3:615.11].012.1

SYNTHESIS AND PHARMACOLOGIC PROPERTIES OF d,l- $\alpha$ -TOCOPHERYL- $\gamma$ -[N-ISONICOTINOYL]-AMINOBUTYRATE HYDROCHLORIDE

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 19, No 9, Sep 85  
(manuscript received 6 Nov 84) pp 1072-1074

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[Abstract] Description is provided of the chemical steps involved in the synthesis of d,l- $\alpha$ -tocopheryl- $\gamma$ -[N-isonicotinoyl]aminobutyrate hydrochloride (I), in order to assess this novel derivative of GABA for effects on cerebral circulation. On the chemical synthesis, isonicotinic acid was converted to the azide by reaction with HNO<sub>2</sub>, the azide reacted with GABA, the latter

products converted to the hydrochloride by reaction with HCl, and then condensed with d,l-tocopherol to obtain I. Pharmacologic testing on cats under general anesthesia demonstrated that I (10-20 mg/kg, i.v.) increased the cerebral blood supply by 32% within 0-10 min of administration for 10-20 min. The effects were due to a reduction in vascular tone of the cerebral vasculature and inhibition of cerebrovascular reflex vasoconstriction. In terms of its effects I was less potent than N-isonicotinoyl-GABA, and induced no meaningful changes in the EEG or the EKG. References 14: 1 Czech, 11 Russian, 2 Western.  
[143-12172/13046]

UDC 615.33.015.2:615.355:577.152.042.2].074

#### TLC METHOD FOR DETECTION OF PENICILLINASE INHIBITORS

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 19, No 9, Sep 85  
(manuscript received 24 July 84) pp 1147-1148

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[Abstract] A TLC method has been developed for uncomplicated and rapid screening of bioactive substances for activity as penicillinase inhibitors. Following separation on silica gel plates, the dried chromatograms are sprayed with penicillinase solution. Zones containing inhibitors inactivate the enzyme in 10-15 min. The TLC plates are then sprayed with a benzylpenicillin solution and, after 20-30 min at 37°C, the chromatograms are sprayed with starch-iodine reagent. In zones with inhibitors there is no uptake of the iodine by hydrolytic products of benzylpenicillin, and they appear as blue spots against a white background. The blue spots can be fixed by placing the plates into a chamber saturated with iodine vapors. Under the conditions employed in the study the optimal concentration of the penicillinase solution was 0.7-1.0 U/ml (0.012 mg/ml) with the use of 0.3-3.0 U of inhibitor per spot. Figures 1; references 5: 4 Russian, 1 Western.  
[143-12172/13046]

UDC 612.854:612.13].014.45+613.644-07:[612.854:612.13

REACTION OF MIDDLE EAR VASCULAR SYSTEM OF GUINEA PIGS IN RESPONSE TO EFFECT OF INFRASOUND

Moscow GIGIYENA TRUDA I PROFESSIONALNYYE ZABOLEVANIYA in Russian No 9, Sep 85 (manuscript received 30 Nov 84) pp 43-44

[Article by V. F. Anichin and A. S. Nekhoroshev, Leningrad Sanitary-Hygiene Medical Institute]

[Text] Until the present time, the mechanism of the influence of acoustic oscillations has been studied insufficiently. In particular, there have been rather few studies of the response of the sound-conducting system to the influence of low-frequency acoustic oscillations.

The purpose of the present study has been to investigate the vascular reaction of middle ear components in response to acoustic influence in the range of 4 Hz, with the intensity of 110 db.

Male guinea pigs, weighing 250-300 g, were selected as experimental animals. The choice of the animals was dictated by the fact that the maximum of their auditory sensitivity lies in the range of 100-1400 Hz, this fact being important for the extrapolation of the obtained data to humans [1,2]. Eighteen animals used in the experiment were subjected to the effect of infrasound with the above-specified parameters. Three experimental series were conducted with a duration of a single effect for 30 min, for 3 hrs, and multiple effects of 3 hrs daily for 40 days. Six animals were used in each of the series. The reaction of the blood vessels of the tympanic membrane (the malleus, inclus, stapes) was studied. Before exposing the vessels (by means of an alkaline phosphatase reaction, according to Gomori) the entire system of the middle ear was fixed and studied under a stereoscopic microscope. As a rule, after any period of exposure to the above factor, a hemorrhage into the middle-ear cavity--most often directly from the bone capsule of cochlea, close to its apex--was observed. With the 30-minute and 3-hour exposures, only point hemorrhages occurred which did not spread. With the 40-day exposure, the size of the hemorrhages was quite large.

In addition, with the 40-day exposure, hemorrhages were observed on the boundary of the ear-drum with the bone part of the external canal and on the body of the incus. Pronounced injection of the vessels was found primarily in the bone capsule of the cochlea. The degree of the injection

was directly proportional to the duration of the effect. In the control group, the vascular system of the bone capsule of the cochlea was feebly marked.

With the infrasonic exposure, the vascular system of the ear-drums became more pronounced. Enzyme activity increased primarily in endothelial and adventitial cells, as well as in the vessel walls.

The extent of the effect of alkaline phosphatase in the vessels depends on the duration of the exposure to the acoustic influence. With the 40-day exposure, the vascular system of the ear-drum was clearly pronounced, while the phenomenon was not observed with a single infrasonic exposure.

With one-time infrasonic exposure for 30 min or 3 hrs, the vascular system of the incus became more apparent than in control animals.

After the action of ultrasound for 3 hrs daily for 40 days, the vascular network was especially apparent, which indicates an increase in activity of alkaline phosphatase in the vessel walls.

The vascular net of the malleus and stapes changed little with any of the exposures used.

Infrasound has a pronounced effect upon the vascular system of the middle ear, which is expressed in hemorrhages into the middle-ear cavity, and, with chronic influence, in the incus and the tympanic membrane.

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12971/13046

CSO: 1840/070

NORMALIZATION OF DYSTROPHIC BRAIN NEURONS OF RATS AFTER HYPOXIA AND TRANS-  
PLANTATION OF EMBRYONIC NERVE TISSUE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 284, No 5, Oct 85  
(manuscript received 8 Apr 85) pp 1247-1251

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[Abstract] Acute hypoxia results in massive irreversible dystrophy of brain cortex neurons. Transplantation of embryonic nerve tissue into the affected area results in statistically significant drop of these irreversible dystrophic neurons. The mechanism of this action is not clear; it could be due to elimination of dead neurons or, conversion of dystrophic neurons to their normal state. The goal of this study was to answer experimentally this question using adult female Wistar rats as test animals and 19 old embryos of the same line as donors. The results showed that 100 days after hypoxia, the level of normal neurons was 57% and of the reversibly dystrophic ones--14% (the level of irreversibly dystrophic neurons was 29%). Due to the death of neurons, the distribution density dropped from 827 to 419 per 50 squares. Four days after transplantation of embryonic nerve tissue, the level of normal neurons was at 36%, that of reversibly dystrophic at 57%, and irreversibly dystrophic at 70%. The density of distribution remained at 826 per 50 squares. One hundred days after transplantation, the level of normal neurons increased to 77%, those reversibly dystrophic dropped to 2%, and irreversibly dystrophic--to 21%; the density of distribution increased from 419 to 746 per 50 squares. Thus it was shown that hypoxia leads to reversible and irreversible dystrophy and death of neurons, while transplantation of embryonic nerve tissue results in normalization of reversibly dystrophic neurons and not just in elimination of the irreversibly dystrophic neurons. References 1 (Russian).

[113-7813/13046]

FACTUAL NUTRITION OF RURAL POPULATION OF GEORGIAN SSR

Moscow VOPROSY PITANIYA in Russian No 4, Jul-Aug 85 (manuscript received 4 Dec 84) pp 10-12

[Article by G.V. Abdushelishvili, Scientific-Research Institute of Sanitation and Hygiene imeni G. M. Natadze, Georgian SSR Ministry of Health, Tbilisi]

[Text] The basic directions of the economic and social development of the national economy of the USSR for the years 1981 - 1985 and for the period up to 1990 as well as the Food Program worked out by the May and November (1981) plenums of the CPSU Central Committee, confirm the vital importance of efforts aimed at the further improvement of the public nutritional structure of our country [5]. The maintenance of public nutrition that is fully adequate has become a task of state significance.

The fulfillment of this task requires more intensive research on the feeding characteristics in relation to age, sex, the nature of employment, national traditions, and geographic conditions.

The specificity of Georgia's climate and geography and the diversity of its landscape account for the distinctive features of the living and working conditions of several groups of the population. Therefore, in order to improve the public nutritional structure and make it more efficient, it is essential to study the actual nutritional practices, the requirements for energy and food components of various population groups in their specific habitat.

The danger of starvation as well as malnutrition has been eliminated for all social groups in the Soviet Union without exception. The nutritional energy value has already been within the normal physiological range for a number of years [1]. However, the composition of the rural population's daily diet still does not conform to contemporary requirements of a balanced diet.

These observations have served as the impetus for a broad comprehensive study of the factual nutrition and health of the rural population in several regions of the republic, including a consideration of the climate, geographic, and vocational characteristics of the groups of agricultural workers under study.



For a number of years field studies during the most intensive agricultural operations of the spring and fall have been undertaken of the factual nutrition and health of agricultural workers (wine-growers, livestock breeders, tea growers, and citrus fruit growers) in both the western (Zugdidskiy, Sachkheriskiy, Khelvachauriskiy, Kobuletskiy, Onskiy) and eastern (Telalvskiy, Tianetskiy) rayons of Georgia.

A weighted-interrogation study was made of the factual nutrition of 25 families (in each rayon) according to a special map suggested by the USSR Academy of Medical Sciences Institute of Nutrition [6], and the composition of the daily diet food products was recorded for a period of 14 days. The chemical composition of that diet was determined (for each test subject) as was the average per capita food consumption.

As is known, the biological and nutritive completeness of a diet is more important than its calorie content [3]. Therefore, the study of the diet's chemical composition included a determination of the proteins, fats, carbohydrates, mineral salts (K, Ca, Mg, and P), vitamins (A, B<sub>1</sub>, B<sub>2</sub>, C, carotene) as well as a calorie count based on the "Chemical Composition Tables of Foods" [4].

In each rayon under study a laboratory analysis was made of the seasonal organic, mineral, and vitamin composition of 10 categories of foods most frequently consumed by the inhabitants. Recipes for preparing the most widely consumed national dishes were recorded, and a chemical analysis was made of some of those dishes.

The working and living conditions of the republic's population have been changing in recent years in connection with the intensive technological and economic development of the country. Technological progress has sharply cut the amount of energy expenditure required for labor processes. This makes it essential to modify the energy expended by the basic vocational groups of the population engaged in agricultural production. With this purpose in mind, we undertook a study of gas exchange by the (Douglas-Haldane) method.

The results of the study of the factual nutrition of Georgia's agricultural workers showed that nutrition has significantly improved in comparison to previous years, in connection with the higher material well-being of the republic. The average daily diet of a kolkhoz farmer consists of 104 grams of protein, 68.8 grams of fats, and 514 grams of carbohydrates. The daily dietary calorie intake (3,100 kcal) basically covers the energy expenditures of kolkhoz farmers (from 2,983 to 3,188 kcal). The examined contingent of the rural population (primarily women, aged 30 to 50 years) was placed into the Group IV category with respect to the nature of their work and the amount of energy expenditure, adjusted for the southern region (-5%).

The average data that characterize the nutritional structure of the rural population for the republic's individual regions are given in the Table.

1. Регион	2. Энергетическая ценность, ккал	3. Белки, г		4. Жиры, г		5. Углеводы, г	6. Минеральный состав, г				7. Витамины, мг				
		8. все	9. животные	10. все	11. растительные		12. Ca	13. P	14. Mg	15. Fe	16. A	17. каротин	18. B <sub>1</sub>	19. B <sub>2</sub>	20. C
1. Телавский	3540	107	56	79	20	607	614	2397	588	29.67	0.3	7.9	2.9	1.7	46.6
2. Тианетский	3059	106	50	87	9	463	834	2045	569	29	0.5	5.5	2.04	1.7	40.1
3. Зугдидский	2760	100	56	56	20	464	696.7	1978.1	627.9	27	0.45	4.2	2.1	1.5	69.1
4. Сачхерский	3170	108.5	52.0	56.0	26.5	558	764	2008	675	33	0.43	10.5	2.0	1.8	73
5. Хелвачаурский	3214	104	55	66.5	20	525	675	2285	666	31.0	0.75	7.6	2.3	1.8	57.8
6. Кобулетский	2984	107	55	66	19	492	713	1941	627	31.9	0.62	3.01	2.6	1.7	56.7
7. Онский	2974	96	49	70	52	490	600	1950	608	30.5	1.41	3.9	2.28	1.42	21.36
8. В среднем	3100	104.5	53.3	68.8	25	514									

Key:

1. Region
2. Energy value, kcal
3. Proteins, grams
4. Fats, grams
5. Carbohydrates, grams
6. Total
7. Animal
8. Mineral composition
9. Vitamins, mg
10. Carotene
11. Telavskiy
12. Tianetskiy
13. Zugdidskiy
14. Sachkheriskiy
15. Khelvachaurskiy
16. Kobuletskiy
17. Onskiy
18. Average

Table 1. Composite Table of Rural Population Nutrition for Individual Rayons of the Georgian SSR in the Group IV Category of Labor Intensity

A comparison of the resultant data to the normal physiological food and energy requirements of various population groups of the USSR [2], indicated that the nutrition of the rural inhabitants of the Georgian SSR includes a high level of carbohydrate consumption (from 607 to 463 g) along with a high level of protein consumption. The consumption of fats is somewhat below the recommended norm, and the amount of vegetable fats in the diet is extremely low.

The mineral content of the diet under study is poor in calcium, but exceeds the recommended national levels of phosphorus and magnesium. The Ca:P ratio deviates a little from the norm (1:2.7 instead of 1:2).

The ascorbic acid content in the rural diet is somewhat below normal, particularly in the spring. Thiamine and riboflavin consumption falls within the normal range.

The analysis of the factual nutrition of rural workers in the Georgian SSR has made it possible to identify the aforementioned nutritional deviations in a number of foods, in spite of the demonstrated sufficient calorie intake.

A comparison of the average per capita complement of foods used by the population at the recommended levels indicates a high level of bakery product consumption and a relatively low level of dairy product consumption in the lowland regions of both the western and eastern parts of Georgia, and a rather high level in the mountainous regions of the republic (Tianeti, Oni, Sachkhere). Only one rayon (Zugdidskiy) is slightly below the norm in the consumption of vegetables. Sugar consumption in the contingent under examination is lower than that for the USSR as a whole.

Meals are basically taken two or three times a day. For those persons who take two meals a day, 40 percent of the daily ration goes for breakfast and 60 percent for supper. At the initiative of the Institute, hot meals are delivered to workers in the fields during intensive field work in order to eliminate the identified shortcomings.

Scientifically substantiated hygienic recommendations have been worked out for the purpose of improving the nutritional structure of the republic's rural population, including a consideration of the principles of a rational diet. A model average daily complement of foods for wine-growers, tea growers, citrus fruit growers, and livestock breeders has been prepared on the basis of analyzing local conditions, including climate and geographic factors and everyday habits that do not contradict the requirements of a rational diet. The implementation of the elaborated set of measures aimed at improving the quantitative and qualitative aspects of nutrition will make it possible to eliminate existing deficiencies in the eating habits of rural workers in Georgia.

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CSO: 1840/074

## MEDICAL CONFERENCES

Yerevan KOMMUNIST in Russian 2 Nov 85 p 4

[Article by N. N. Blokhin, president, USSR Academy of Medical Sciences, hero of socialist labor and academician; M. Ye. Bartanyan, deputy general director, All-Union Scientific Center of Psychiatric Health, USSR Academy of Medical Sciences and corresponding member of the USSR Academy of Medical Sciences; E. S. Gabriyelyan, corresponding member, Academy of Sciences of the Armenian SSR and Minister of Health of that republic; and V. I. Votyakov, presidium member, USSR Academy of Medical Sciences, chairman of the commission for chemotherapy for viral infections and corresponding member, USSR Academy of Sciences; published under "Communist" rubric: "Borders of Scientific Cooperation"]

[Text] A joint meeting of the presidiums of the USSR Academy of Medical Sciences [AMN USSR], the Academy of Sciences of the Armenian SSR, and the collegium of the ArSSR Ministry of Health took place in Yerevan. A complex program for the development of medical science in Armenia between 1986 and 2000 and issues of coordination of the efforts of medical-biological and other institutions in the solution of urgent problems of theoretical and practical medicine were at the center of the attention of its participants.

Its participants speak of prospects for broad cooperation between the AMN USSR, the Armenian Academy of Sciences and the Ministry of Health ArSSR and of other issues discussed at the conference.

[Comments of N. N. Blokhin]

"Cooperation between the AMN USSR and the medical academies of the union republics has its own history. A joint session of the USSR Academy of Sciences and the AMN was held in 1980. Problems connected with the fundamental questions of medicine and the possibilities of attracting to them the attention of specialists from other areas of science were discussed at the session.

"We are constantly feeling the necessity of communication with scholars of the republics of our nation. For the last 5 years, we have conducted joint meetings of the presidiums of the AMN USSR with the presidiums of the academies of science of Belorussia, the Ukraine, Georgia, and Azerbaijan.

And here we are in Armenia. I have to say that this acquaintance with the medical institutions of the republic has made a great impression on me.

"It is delightful that in Armenia, alongside intense work in the most important directions of modern medicine, they have given great attention to other areas that have not traditionally appeared in our public health care.

"The creation of a proctological center here is an event. There are only two such institutes in the country. One is in Moscow, and the other is in Yerevan. One can call this diagnostic center unique in its capabilities and potential.

"In Armenia, we have always seen great attention given to the problems of medicine related to the administration of the republic's Academy of Science. One of the good organizational ideas belongs to Academician V. Ambartsumyan on the basis of several institutes of the Academy, at first, of one of the large institutes having an engineering profile. This is the path to real cooperation, to the creation of joint collectives.

"The completed joint meeting, it seems to me, was timely, expedient, and promising. The further concentration of the efforts of scholars-physicians and representatives of other sciences will cooperate in accelerating scientific-engineering progress and in realization of the large-scale problems of strengthening the health of the Soviet people and increasing the continuity of their active life, which the Party has placed before us in the new edition of the program of the CPSU."

[Comments of M. Ye. Bartanyan]

"The joint meeting of our academies and the ArSSR Ministry of Health of the republic has an enormous significance inasmuch as the AMN USSR, unfortunately, has not had close scientific contacts with the scholars-physicians of Armenia.

"A problem in which our interaction is desirable is the fight against alcoholism. At present, broad prospects are opening for studying the mechanism of the addiction to alcohol as well as to other toxic substances.

"It would be extremely interesting if Armenian scholars-biochemists, biologists, and psychiatrists were to include this problem in their studies more actively than it has been up to now. An all-union interdepartmental program on overcoming drunkenness and fighting alcoholism has now been created. It demands study and directed research to understand the factors that determine human addiction to alcohol. If the development of such an operation is successful, it will be a very serious contribution of Armenian physicians to the general state program.

"With regard to broader problems relating to the mental health of people, Armenian scholars, it seems to me, can make a worthy contribution to our social program. We would very much like to develop a joint investigation with Armenian psychiatrists in the area of psychopharmacology, which is a very important direction. It is expedient to create a laboratory of our

institute in Armenia. We are now conducting talks with the directors of the republic's psychiatric hospital.

"These are our plans. If we are successful in realizing them in the near future, it will be a great achievement that will benefit both the AMN USSR and Armenian psychiatrists."

[Comments of E. S. Gabrielyan]

"The medical workers of Armenia have come to a joint meeting with important results in the matter of rendering medical assistance to the population of the republic. Among these are the intensified attention to the general prophylactic medical examination of workers, the systematic retooling of health care in rural areas, the creation of departments of regenerative treatment in polyclinic institutions, and the introduction of new forms of matching public health care to the needs of the population, etc.

"However, an awful lot remains to be done. First, to increase the output of scientific-research institutes, it is necessary to accelerate the introduction of the results of scientific research into practice. Science must serve the principal matter more completely, namely, strengthening of the health of the Soviet people.

"The joint meeting of the presidiums of the AMN USSR, the ArSSR Academy of Sciences, and the collegium of the ArSSR Ministry of Health has opened a new page in the development of medical science and the public health of Armenia. Similar interaction is not a short-term campaign. In fact, it predetermines important boundaries in the progress of science before the year 2000. The cooperation that has begun will have great significance in raising the level of research and the further development of public health. It is gratifying that a prospective plan for active personnel training is being developed. It will be conducted in two directions. On the one hand, the formation of command scientific-medical workers--what I have in mind first is young doctors of the sciences--and, on the other hand, the matter of purposeful graduate study in the large centers of our country. Undoubtedly, a similar practice should facilitate the process of public health in Armenia and of medical science in general."

[Comments of V. I. Votyakov]

"Several years of close cooperation between the Academy of Medical Sciences and the academies of sciences of the union republics has confirmed that an immense scientific potential, which has been called to serve the protection of human health, does exist. Life has shown that often physicists, mathematicians, biologists, chemists, and representatives of other disciplines cooperate selflessly with physicians and have become enthusiasts in this area.

"The united meeting of the presidium of the AMN USSR, the Armenian SSR Academy of Sciences, and the ArSSR Ministry of Health has permitted us to use more completely scientific efforts that have not been directed to a unified center in this necessary channel.

"Inventory of what has been accomplished at the joint meeting is not a formal problem. After the agreement stage comes the stage of the concentration of efforts, the intelligent use of engineering and scientific potentials, in particular in the treatment and prevention of infectious diseases.

"Lately, many have written, and still more has been spoken about AIDS, an insidious viral disease that has now spread to more than 40 countries. What is in store for this disease? One of the types of oncoviruses kills the cells that are the main factor in immunity and causes acquired immune deficiency syndrome, which is called AIDS for short.

"The person acquiring the disease begins to lose weight and becomes weak, and a path for any infection is opened in his or her body. The fight against this virus is very difficult, because it penetrates into the hereditary apparatus of the cells and, together with the cells, transmits its DNA to the next population.

"No instance of AIDS has been recorded in the Soviet Union. However, our scholars are searching for ways of counteracting this disease. Corresponding models of the culturing of the AIDS virus outside the body have been developed. The prospects of creating a barrier for this infection are unfolding favorably."

12794/13046  
CSO: 1840/140



## HEALTH IN KIRGHIZIA

Frunze SOVETSKAYA KIRGIZIYA in Russian 4 Oct 85 p 3

[Article by Deputy Chief, Administration of Therapeutic-Prophylactic Acid, Kirghiz SSR Ministry of Health, Ya. Litvak: "Preventive Health Examinations: First Steps"]

[Text] The constant concern of the party and the government for the health of the Soviet people finds its expression in continued improvement of services at the primary levels of health care, strengthening of the preventive programs, finding local resources to improve the medical and preventive services for urban and rural populations and in preparing for and carrying out general dispensarization (preventive health examinations).

The major goal of preventive health examinations is to maintain and improve the health of a population, increase longevity and raise the productivity of employees by active detection and early treatment of incipient forms of a disease, and detection and elimination of the factors responsible for origination and spread of diseases.

Systematic medical monitoring of the health of a population has to rely on a strong material and technical base of health services. Such a base exists in the Kirghiz Republic today. More than 12,000 physicians and some 36,000 secondary medical personnel are providing care for the population. Ten nursing schools and the Kirghiz State Medical Institute are training personnel, and the hospitals are well equipped with modern facilities. New outpatient clinics and health stations are opening on collective and state farms and at industrial enterprises. At large factories, medical-sanitation departments have physiotherapy units.

Prevention centers at livestock breeding farms are no longer a rarity. They provide an opportunity for general recuperation as well as for treatment prescribed by a physician. For residents of remote villages, 90 ambulatory physician-stations have been opened; in addition, a new system of health care has been developed: teams of highly-skilled specialists travel to the sites where villagers live and work.

What are the early results of health examination programs? It has been established that a considerable proportion of the population never visit medical institutions. Such people will be invited to health centers for preventive examinations. Most will have their health checked on a current visit to the outpatient clinic or during a hospital stay. Those who are housebound will be examined by medics at home.

Great efforts are currently being exerted by district outpatient clinics to improve the medical services to the working people and save time both for patients and for the medical staff. Setting up health rooms, medical pre-screening, improved patient registration, and adjustment of physician schedules to the population working patterns--all these measures will help improve the productivity of physicians and physician aides and reduce the waiting time in reception rooms. This is especially important since from 9 to 13 percent of patients come to the health centers during their working hours.

The conditions and capabilities for annual health screening of the entire population differ in urban and rural areas. The villagers are faced with difficulties since they live away from the rayon and oblast centers. For a total health screening, traveling medical teams have been organized. Screenings conducted on this basis in At-Basha and Toktogul rayons and in Taldy-Sul village of the Tupsk rayon have revealed patients who had been unaware of their disease, which was first detected during the examination. This is an eloquent confirmation of the efficiency of preventive examinations.

However, full monitoring is a task that cannot be shouldered by the district health services, even if supported by physicians of other specialists. Active assistance by all health services, government and public agencies will be needed. Active educational work, explaining the goals and objectives of annual health examinations, inculcation of hygienic practices among the population to promote prevention of disease and the principles of a healthy life should be conducted everywhere by volunteer boards at health institutions, agencies of the Union of Societies of the Red Cross and Red Crescent and the sanitation units operating under their guidance on collective and state farms, at schools, and in housing projects. This work will offer active support to health care and prevention agencies.

It should be borne in mind that the new organizational forms of health care are not always correctly understood by the population. Those accustomed to going to see a physician only when they are sick are reluctant to come to a checkup. There is a certain psychological barrier in people's minds that has to be broken. The annual preventive health examinations should be conducted under the following slogan: "Health for the Healthy." Regular physicals make it possible not only to detect a disease in the early stages but also to observe from year to year and correct the health condition of each individual. In addition, during the physical, recommendations are given to individuals about their diet, work and rest schedules, stress levels, and sports activities according to their personal specifics.

We must all join in the effort to educate each member of our society to the habit of treating his own health as an asset belonging to the state and to show more intolerance toward "violators" of hygienic standards. These include, above all, those abusing alcohol, heavy smokers, people avoiding all sports activity or physical culture, overeaters, etc. Being responsible for one's health to oneself, to one's family, and to society in general should become a basic life principle for each citizen. The practical implementation of these objectives will largely depend on an aggressive, active posture of the public and the efforts of each work collective.

9922/13046

CSO: 1840/083

## MATERNITY PROBLEMS IN ROSTOV

Moscow PRAVDA in Russian 19 Oct 85 p 3

[Article by M. Kryukov, PRAVDA correspondent, Rostov-on-Don]

[Text] Last summer, an outbreak of an infectious disease in infants occurred at maternity hospital No 5 in the city of Rostov-on-Don. Similar cases had occurred previously in other maternity hospitals of the city and oblast. But they were not in such numbers as at No 5 where more than 60 infants fell ill, several of whom were not saved.

An emergency at a maternity hospital is always special, because it concerns infants. And that says it all. The incident at No 5 has been discussed at many levels. Reasons for the outbreak of the disease were also analyzed at a bureau meeting of the Rostov-on-Don CPSU city and oblast committees, as well as at meetings of epidemiological commissions of the city, oblast, and, at last, at the national level. Many employees, whose duty it was to prevent the trouble but did not take the required measures, have been severely punished.

When the incident at No 5 became known, "Something like that ought to be expected" was heard on many occasions. It seems that one could assume that the trouble would happen. Documents compiled by various commissions and officials confirm that. Here are some excerpts:

"According to the sanitary norms of space for one mother's bed and one infant's bed, the maternity hospital No 5 was designed for placing 70 beds, but actually there were 155 beds." "The reasons for the group morbidity of infants were violations of the sanitary and counterepidemic regimen at the maternity hospital. The spreading of the infection was promoted by the overcrowding at the obstetric hospital." "The need of the maternity hospital for sterile materials was not met, and nonsterile clothes were used for swaddling infants." "Keeping of nonpasteurized milk was permitted."

"Sanitary and technical conditions of the building are unsatisfactory. It has needed major repairs for a long time." "Severe irregularity in supplying hot and cold water made it extremely difficult to observe obligatory sanitary rules, functioning of the delivery room, and personal hygiene of the medical personnel."

The emergency necessitated a more thorough look at the condition of the obstetric service as a whole--in the city and oblast.

The picture was not comforting. More than half of the maternity hospitals are situated not in specially-designed facilities, but in adapted ones. Some of them do not meet sanitary-hygienic requirements. A difficult situation arose in Rostov as well. The specialization of maternity houses has not been constantly maintained.

The problem is that all maternity homes are to be closed for prophylactic maintenance no less than once a year for a month. This is in addition to current and major repairs. The closed maternity home is moved to reserve premises, about which there is a special order of the USSR Health Ministry. But, there is no such facility in Rostov. Therefore, other maternity homes get overloaded. Since they are already crowded, the overcrowding increases the danger of disease.

Thus, there is now a pressing problem of establishing a reserve maternity home to assure current repairs as planned, as well as disinfections of maternity homes in strict adherence to the schedule--once a year.

After the incident at No 5, builders quickly finished the repair of maternity home No 2 which had been progressing at a snail's pace. Now, that maternity home is operating. The No 5 has also been brought to standard. Chief Physician Yu. Dolzhanskiy believes that normal working conditions have for the most part been created. But not all the problems have been solved. For example, the maternity home needs a more reliable autonomous water supply.

Near the old building, another maternity home for 120 beds is being constructed. Great hopes are pinned on it. Unfortunately, the construction has been delayed. The last deadline was said to be September. But here we are walking along the stories of the new building, and it is apparent how much more needs to be done.

Chief Physician of the maternity home V. Zubkov has already been appointed.

"Do you know what those who are building the maternity hospital are lacking?" he asked. "Soul! Not all realize what they are building. From this is the quality of their work."

The building is being constructed by the "Rostovgrazhdanstroy" Trust. The deputy manager of the Trust, A. Ryaboshapko, had difficulty giving the exact date when the building would be finished.

The Scientific Research Institute of Obstetrics and Pediatrics is in Rostov. During the meeting of the bureau of the CPSU Obkom, it was emphasized that the institute kept aloof from creating a unified system of obstetric and reanimatological help in the city and oblast for women and newborn children.

I happened to visit the Institute. During the last year or two, it has been equipped with remarkable equipment. The director of the institute, V. Orlov, showed us around the laboratories and told us about the measures which have been undertaken by the group of researchers to render more effective assistance to practical obstetrics. Among these measures, reanimating brigades have been organized. To ensure closer contact with medical practitioners, an Association, "The Institute--The Oblast Hospital," is being created.

At present, with the help of computer technology, notice about each citizen, born in the course of the day, and the state of his health, reaches the Department of Science and Teaching Establishments of the Party Obkom, it gets to the Oblispolkom, the Oblast Health Department, and the Institute. If necessary, required measures are taken immediately.

Repair and strengthening the material and technical base of all maternity hospitals in the oblast have been envisioned. Old medical equipment will be replaced. Laundry facilities are being put in order. The number of obstetrician-gynecologists and medium-level medical personnel is being increased...

These and other measures are called for in providing reliable help to mothers and infants, and ought to be implemented as soon as possible.

12971/13046  
CSO: 1840/081

## RESOLUTION OF URBAN HEALTH CARE PROBLEMS: PRELIMINARY RESULTS

Moscow MOSKOVSKAYA PRAVDA in Russian 18 Sep 85 p 2

[Article by E. Timofeyeva]

[Text] The introduction of something new into mass production requires at first an experimental model, and then a small series. The experiment conducted in Sverdlovskiy Rayon's Polyclinic No 21 may be likened to just such an experimental model, the model upon which future mass production will be developed. Only here we are talking about things incommensurable, if you will, with the production of any machinery, however complicated, about a matter exceptionally important and necessary for everyone--mass clinical evaluation and treatment [dispanserizatsiya] of the population or, more precisely, the stages of nonhospital medical [vnebolnichnyye] institutions' transition into them. Much has been written, and need not be repeated, to the effect that each of us, regardless of whether we are well or ill, must visit the physician who treats us and undergo examination by specialists once a year.

The problem lies elsewhere--How to train rayon polyclinics to perform mass clinical evaluation and treatment more effectively and efficiently; how to make the process absolutely mandatory; and how to help the district internists, upon whom the process primarily is oriented, handle the problems arising in it. The number of these "hows" can be increased endlessly, and only an experiment can provide answers to them and make possible the stating of preliminary results. Such was the goal in conducting the experiment. The choice, of course, fell upon the city's best polyclinics. Polyclinic No 21 was among them. However, let us be frank--It is unlikely that Chief Physician Irina Nikolayevna Ispolatova and her colleagues doubted in the least that the experiment (It lasted 5 years) would require a tremendous strain on efforts and nerves and the mobilization of all reserves; and that it promised not only praise of the administration, but also the highly likely trouble which, alas, not a single experiment can avoid. Now, with the passage of several years, it may be said that everything was just that way, but this "everything" faded into the background. The main thing is that they managed to reach the goal--to prove, both to themselves and to others, that the transition to mass clinical evaluation and treatment is possible, and that its stages have been worked out.

But the experiment was begun like this: Special invitations were put into the mailboxes of all future patients, and these numbered no fewer than 25,000 persons. The task of leaving no doubt that each addressee had received the printed form, an extremely time-consuming one you will agree, was placed upon the nurses' shoulders for the sake of the experiment's "purity." But, alas, even this did not lead to the desired results--Only a tenth of the population responded to the physicians' appeal. This was something to think about. Even so, wherein lay the cause--in unwillingness to spend time in line at the office, in disregard for their own health, or in a certain psychological mind-set or insufficient public-health and preventive-medicine propaganda? Apparently it lay in the one, the other and the third. However, in considering this fact among the experiment's preliminary results, let us not draw hasty conclusions as, strictly speaking, they did even in the polyclinic. Here we have arrived at another practical conclusion, suggested and confirmed by the experiment's entire subsequent progress: Clinical evaluation and treatment must not be predicated solely upon the population's initiative, upon its desire or disinclination to undergo them; they must be given the force of law, or else there is danger of their being turned into formalized measures "just for the records."

How to do this is the concern not only, and not so much, of physicians alone. The united efforts of all interested parties are required--the administrations of the NII [scientific research institute], enterprises, and labor union and party organizations--and control over compliance is necessary. The latter may consist, for example, of nobody's being able to apply for routine vacation without certification of having undergone clinical evaluation and any necessary treatment. Other alternatives also are possible, and this is not the point. Something else is important--to make this form of preventive-medicine work customary, maybe even forced at first, and to get everyone used to the idea that the traditional annual examination is mandatory.

Under the terms of the experiment, a department of clinical evaluation and treatment and preventive medicine was established in the polyclinic, and the appropriate staff was assigned. Physicians of seven specialties received patients daily, and drove out to the NII, the plants and the ZhEK [housing utilization office]. The assignment of special staffs for such departments in rayon polyclinics is not envisaged for carrying out clinical evaluation and treatment. However, this in no way means that the experiment was conducted under greenhouse conditions beyond the realistic means of the ordinary polyclinic. The point is that it was necessary to establish the maximum workload for physicians in performing clinical evaluation and treatment as objectively as possible; to determine the kinds of illnesses most often encountered; and, finally, to work out an optimum patient-receiving procedure, convenient for both patient and physician. Not for nothing does the experiment bear the name scientific and practical; and these principles, built in at its inception, largely have determined the results obtained: After a second clinical evaluation and treatment process, the percentage of people classed as ill the year before was somewhat reduced. Of course, examination per se, however competent it may be, is not the goal in itself. After it, it is necessary that a person



undergo a course of treatment without fail, if required, and not abandon it after, say, two or three sessions of physiotherapy, but see it through to the end. This problem, not just organizationally but psychologically as well, is no less difficult than the first stage of clinical evaluation and treatment--the preventive-medicine examination.

Truisms must be repeated, but what can one do--They still have not lost their relevance, and the experiment has confirmed this once again: Where the desire to restore health was mutual, there was a result as a rule. But how many people have considered an ailment discovered in clinical evaluation and treatment unimportant and, despite its being prescribed, not worried about subsequent treatment? The experiment provides an unequivocal answer to this question--The number of such people is sufficiently great for this problem to be seriously dealt with in the course of the beginning annual clinical evaluation and treatment of the entire population. For, as a matter of fact, the preventive-medicine examination and the subsequent treatment--these are two straight lines, coming together, like the sides of a triangle, at the one point from which begins the measurement of the level of our physical and mental condition, our health.

12319

CSO: 1840/082

IMPROVEMENT OF TERRITORIAL ORGANIZATION OF MEDICAL SERVICES TO POPULATION OF  
AZERBAIJAN SSR

Baku NARODNOYE KHOZYAYSTVO in Russian No 7, Jul 85 pp 21-25

ISMAILOV, V. A., Azerbaijan State Medical Institute imeni N. Narimanov

[Abstract] The article reports measures being taken to provide comprehensive health care throughout Azerbaijan. Issues addressed include proper selection of clinic and hospital types to correspond to specific local needs and personnel availability, rather than wholesale construction of hospitals that subsequently cannot be staffed or equipped properly. The recommendation is that larger, regional centers be built that can support sophisticated diagnostic and treatment facilities, with "feeder" clinics in less populated areas. Up to the present time, no general study has been made in Azerbaijan that would determine types of services and facilities required in the republic, but the need for specific standards for villages and towns, considering climate, geography, population density, and occupational composition, available transportation and communications, is obvious. Distances between cities and villages, distances between medical facilities and economic peculiarities of specific locations are to be studied. Areas of irrigated agriculture, which may have thin or dense population density, mountainous regions with large cities and those with few inhabitants, each must be provided with suitable local medical services while more sophisticated diagnosis and treatment is accomplished in major centers.

[077-12131/13046]

CHILDHOOD DISEASES IN ADULTS

Moscow LITERATURNAYA GAZETA in Russian 21 Aug 85, p 13

YANKULIN, Vladislav

[Abstract] In the 1970's, physicians in large cities suddenly noticed dozens, even hundreds of cases of childhood diseases, such as measles and chicken pox, among adults. Military physicians observed childhood diseases among adult soldiers. At Leningrad's Pediatric Medical Institute, Doctor of Medical Sciences V. A. Postovit wrote a monograph on the subject, although

the phenomenon is hardly restricted to Leningrad. The serious results of childhood diseases such as mumps and chicken pox in adults are noted. In addition to naturally milder course among children, childhood diseases are also much more frequently properly diagnosed in children than in adults. The most serious cases are observed in the healthiest areas, where many of the adult population have never had the childhood diseases. Inoculation immunity is found to be frequently not as effective in preventing the disease as natural immunity achieved by having the disease as a child. The answer is development of improved vaccines rather than avoidance of vaccination to allow nature to take its course.  
[042-6508/13046]

#### SCIENCE RESPONSIVE TO TRENDS IN NATIONAL INTEREST

Yerevan KOMMUNIST in Russian 3 Nov 85 p 4

Armenpress

[Abstract] Academician N. N. Blokhin, President of the USSR Academy of Medical Sciences, met with scientific and medical community of Yerevan during the concurrently held session of the Presidia of USSR Academy of Medical Sciences, ArmSSR Academy of Sciences, and The Collegium of Republic's Ministry of Health. He recalled the early post World War II era when the President of ArmSSR Academy of Sciences, academician V. A. Ambartsumyan began organizing the Institute of Tropical Diseases because malaria was then the chief cause of mortality. During those years, efforts were made to return war invalids to useful and productive life. Later, the goals changed aiming at cardiovascular diseases, brain disorders, and cancer. Other problems concerned reconstructive surgery, immunology, genetics, viral diseases, and maternal and child health. Eventually, space medicine came to the forefront. To cover all these activities large scientific centers were organized throughout the country, even out in Siberia and the Far East. Next, Blokhin addressed early diagnostic problems, mechanisms of disease development, and novel therapeutic methods. He attacked smoking and alcoholism and stressed preventive programs. The final topic concerned prevention of nuclear war. He stated that since 1918 [typo in text?--Abstractor] American and Soviet physicians debate all aspects of such a catastrophe and work together against proliferation of atomic arms.  
[137-7813/13046]

#### PROJECTION OF SCIENTIFIC COOPERATION GOALS

Yerevan KOMMUNIST in Russian 31 Oct 85 p 2

Armenpress

[Abstract] A combined session of the Presidia of USSR Academy of Medical Sciences, ArmSSR Academy of Sciences, and The Collegium of Republic's Ministry

of Health began on the 29th October in Yerevan with participation of leading scientists and Public Health officials, who addressed scientific-technological cooperation among these organizations. Academician N. N. Blokhin, President of the USSR Academy of Medical Sciences, Hero of Social Labor, said that such a collaboration has already been in existence since 1980. It started in medicine and expanded to other areas. Advances made by Armenian scientists were noted in diagnosis, in development of new drugs, new treatment methods for cancer, etc. The President of ArmSSR Academy of Sciences, twice Hero of Social Labor, Academician V. A. Ambartsumyan observed that medicine was traditionally one of the most important sciences in Armenia. Currently, there are many scientific centers, clinics, and institutes with highly qualified staff. He noted the productivity of the Institute of Fine Organic Chemistry imeni A. L. Mndzhoyan in the area of new drugs for cancer, cardiovascular, and CNS diseases. The ArmSSR Minister of Health, E. S. Gabrielyan, stated that the health status of a nation is a measure of progress and of general improvement in Public Health programs; all scientific research institutes should participate in solution of these most important problems.  
[139-7813/13046]

#### COMPUTERIZED BLOOD ANALYSIS

Moscow SOVETSKAYA ROSSIYA in Russian 9 Oct 85 p 6

ORLOV, V., Leningrad

[Abstract] Health status assessment on the basis of blood diagnosis constitutes one of the most efficient and reliable medical criteria, and is eminently suitable as a tool in mass screening. These points were emphasized by Professor Kiril Pavlovich Ivanov of the Institute of Physiology imeni I. P. Pavlov. What makes this approach so valuable and applicable to mass screening is that computer programs are being developed which will make it possible to obtain results on the morphological and biochemical characteristics of blood in a matter of minutes. Presently available technology makes it feasible to measure some 60 of the most important biochemical parameters. It is anticipated that in the next year-and-a-half to two years a fully automated computer-based system will be available to improve diagnostic efficiency and enrich the medical data bank on physiological limit values.  
[102-12172/13046]

#### MATERNAL AND CHILD HEALTH CARE IN KIRGHIZIA

Frunze SOVETSKAYA KIRGIZIYA in Russian 14 Sep 85 pp 1-2

[Abstract] The Kirghiz CP Central Committee and the Kirghiz SSR Council of Ministers have addressed themselves to the quality of maternal and child

health care and welfare in the Kirghiz SSR, and have noted both positive and negative trends. On the plus side are the many new facilities that have been made available to the group of interest, and the training and encouragement that is provided to specialists in these areas of medicine and public health. However, there are also many shortcomings, in that rural areas appear to be lacking the type of medical professionals that are available in cities, while those that do come to villages constitute only a transient factor. Many health facilities intended for maternal and pediatric care are understaffed and overcrowded with patients, equipment and instruments are in short supply, and upkeep is inadequate. Dietetic foods for women and children are not produced in sufficient quantities in Kirghizia, and the same can be said of many health supplies. It remains the responsibility of the various ministries of the Kirghiz SSR and the departments to institute reforms and improvements in the sphere of maternal and child health care to meet the goals of the 12th Five-Year Plan.  
[104-12172/13046]

#### MEDICAL ASSISTANCE FOR ALCOHOLICS

Moscow NEDELYA in Russian No 39, 23-29 Sep 85 p 15

VOLEVICH, G., correspondent, narcologist-physician

[Abstract] One of the most effective means of treating alcoholism is a psychotherapeutic approach formulated by A. R. Dovzhenko, Republic Narcological Psychotherapeutic Center, Feodosia, Crimea. With various modifications and adaptations, his therapy is receiving increasing approval and support, including that of the USSR Ministry of Health. Talks with a number of physicians specializing in the treatment of alcoholism and substance abuse problems across the USSR has shown that physicians alone are limited in what they can accomplish, and that the full potential of the Dovzhenko therapy can only be realized with the support of local governing bodies. Several physicians have commented on the Dovzhenko approach and the manner in which they apply it to their practice, including Yu. A. Vyalba in Moscow, S. L. Donskaya in Minsk, O. T. Kostyuk in Kiev, B. G. Sobetov in Lvov, and S. M. Simonyan in Yerevan.  
[108-12172/13046]

#### WARNING: NITRATES

Frunze SOVETSKAYA KIRGIZIYA in Russian 1 Sep 85 p 3

SHAPIRO, B., deputy minister of health, KiSSR, Head State Sanitary Physician of the Republic

[Abstract] During the peak of the fruit season, about 10-15% of patients in Frunze are reporting with symptoms of nitrate poisoning. Recent growth in

in agricultural productivity could be ascribed to indiscriminate use of mineral fertilizers. According to the data of public health, contamination of the agricultural products with nitrates is above the permissible level. More than 50% of potatoes have contained a four-fold excess of nitrates. This pattern is predominant in other areas of the republic, with other vegetables as well. This was especially noticed in cultures of cucumbers, melons, pumpkins, onions, etc., exceeding the normal levels up to ten-fold. Obviously, control over distribution and application of these fertilizers was at fault. The organs of public health were blamed for their inability to control this problem. Even though it was acknowledged that chemization of the agriculture is unavoidable at this time, the goals presented were aimed at achieving good quality products with proper health measures being maintained.

[106-7813/13046]

#### MEDICAL TECHNOLOGY ADVANCES

Moscow ARGUMENTY I FAKTY in Russian No 36, 3 Sep 85 pp 1-2

[Interview of B. Leonov, director, All-Union Scientific Research and Testing Institute for Medical Technology]

[Abstract] The article reports on comments relating to laser surgery, cryogenic instruments for recording ECG's, and various types of suturing devices and ultrasound equipment. The placement of this equipment has reached most cities, although smaller dispensaries still lack the latest technology. The director stresses the fact that the best Soviet medical equipment, such as that for eye surgery, has received considerable interest abroad and licensing arrangements have been made. He asserts that while only the most exclusive private clinics abroad have "state of the art" medical technology, the achievements of Soviet medical technology are available to all Soviet citizens. The uneven distribution of such equipment, he states, is more a matter of problems and personnel shortages for putting modern equipment into service. He also comments on the recently mandated annual preventive medical checkup program for every Soviet citizen, noting that proper equipment can contribute to better personnel utilization for higher quality examinations and early discovery of cardiological, gynecological, and other ailments. A Latvian-produced automated system, "Kasmon," which can evaluate 15 different medical conditions, and a preliminary examination system KDO-01, are cited as innovative diagnostic equipment. Radio-immunological analysis of cells with the "Gamma 12" and "Beta-2" apparatus can identify ailments in large numbers of subjects. Joint production and purchases from CMEA countries are cited as ways to fill needs not taken care of by domestic Soviet production.

[078-12131/13046]

FORMATION AND COURSE OF NEUROPSYCHIC DISORDERS CAUSED BY OCCUPATIONAL HEALTH HAZARDS

Moscow GIGIYENA TRUDA I PROFESSIONALNYYE ZABOLEVANIYA in Russian No 8, Aug 85 pp 48-50

[Article by D. M. Mendelevich and K. K. Yakhin, Medical Institute imeni S. V. Kurashov, Kazan]

[Text] The expansion of human job-related activity that has been taking place during the scientific-technological revolution and the appearance of new industrial sectors are creating new working conditions that encompass increasingly broader segments of the population. In this connection, problems that are connected with successful human adaptation to both the social environment and complex working conditions are beginning to take on growing importance [6, 22].

Whereas both a clinical description of the personality forms of reaction and development and an elaboration of the "soil" concept, the features of mental trauma and its systematics are characteristic of borderline psychiatry [7, 9 - 11, 17, 18], the study of so-called job-related neuroses is still at the stage at which clinical data are being collected.

In our view, much of this research on this subject has a significant shortcoming. An examination is made of a job-related factor and the disorders which appear in persons exposed to this occupational hazard are then established. However, not a single one of the external stimuli has an absolute meaning in the development of the clinical manifestations, since its effect is defined by the correlations between the hazardous exposure and the condition of the equipment affected by the hazard. Hence, the most important tasks of job-related-oriented psychiatry comprise a systematic classification of data on the interaction of environmental and body factors, the identification and classification of typically industrial hazardous factors, a description of mental and psychosomatic responses induced by those factors, and the elaboration of preventive measures.

Of considerable interest in this aspect are the studies on the systematization of extreme environmental factors and bodily responses within the concepts of physiogenic and psychogenic asthenia [13, 14]. However, in identifying the asthenic syndrome as the initial unit response to external stimuli, one loses sight of the fact that no matter how soon

and isolated the development of asthenia might be, it is preceded by disorders of another spectrum.

The system responsible for the maintenance of optimal conditions within a body's internal medium was developed through evolutionary stages. One of its most important components is the autonomic nervous system with its ergo- and trophotropic functions. Regulatory mechanism stress, accompanied by autonomic instability, takes place in response to abrupt environmental disturbances or prolonged exposure to occupational hazards.

Our own observations and the data of other authors [21, 23] would suggest that such cases represent a stage of preclinical disorders whose structure depends not only on the nature of the stimulating factor, but also on the subject's personality characteristics and the status of his higher nervous activity. We have found that when the predominant factors are physical and mental, the preclinical disorders may be limited to symptoms associated with changes in autonomic regulation. The disorders we have observed would seem to serve as individual symptomatic manifestations of autonomic-vascular dystonia of a constitutional nature [4]. These disturbances are most clearly manifested when heightened demands are made upon the adaptive mechanisms of the CNS. Personality responses are characteristic of preclinical disorders caused by informational overloads.

A common radical of both groups of preclinical disorders is their partiality, their situational dependence, time limitation, and absence of syndromological completeness. However, if one views human mental activity as a system composed of separate subsystems [2], then a reduced level of activity in one of them will cause a system imbalance as a whole, thereby weakening its adaptive capabilities, which in turn could cause the development of persistent mental disturbances.

The nature of the preclinical disorders is more polymorphic when occupational activity places heightened demands both on personality and biological substructures. This is clinically manifested by symptoms of alarm, partial asthenia, autonomic dysfunction or situational responses that depend on the "soil" affected by this hazard.

The "soil" often plays a more important role in the build-up of preclinical disorders than direct factors which seemingly manifest a previously latent structural-functional deficiency of the CNS or premorbid personality characteristics. When physico-chemical job-related hazards are predominant, compensatory CNS mechanisms play a greater role, and various versions of personality accentuation are of primary importance on the personality level of response [12].

For confirmation of that hypothesis, we might refer to our research on the effect that partial sensory isolation has on the neuro-psychic health of persons who work at plants that manufacture photographic film [25]. A clinical, experimental-psychological, and clinical-statistical study of the



incidence and timing of preclinical and clinical manifestations of neuro-psychic disturbances in persons working in complete darkness, showed that those disturbances were reliably ( $P < 0.05$ ) influenced by the production factor of darkness and a number of non-production factors. These include premorbid personality traits in the form of accentuated sensitive and hysterical type characters ( $P < 0.05$ ), and phenomena of autonomic instability and residual-organic cerebral insufficiency ( $P < 0.001$ ) which were completely compensated prior to working in darkness. One should also include among the risk factors personality formation conditions, housing and domestic conditions, and conflict situations in the family and at work ( $P < 0.05$ ). Similar characteristic patterns were identified by other authors who studied the formation of neuroasthenic reactions in diamond cutters and telephone operators [5, 20].

The examples cited above indicate that the principle of multi-faceted analysis must be applied in the area of industrial psychiatry, and that a thorough study of non-production factors that frequently play the role of risk factors can lead to the elaboration of new ways of preventing neuropsychic disorders.

The transition from the preclinical disturbance stage to the stage of functional neuropsychic disorders is marked by the appearance of neuroses-type disorders that are concisely complete syndromologically and relatively constant.

It is generally considered that the personality of a patient suffering from neuropsychic disturbances of a job-related origin does not entail neurosis-type symptoms. Our data and analysis of the literature allows us to accept only that part of the aforementioned hypothesis that deals with the absence of the personality's response to illness. At the same time, we have observed that neurosis-type symptoms are tightly interwoven with the patient's personality traits. The impossibility of distinguishing character traits from neurosis-type symptomatology is, in our view, the cause of anosognosia that appears as a result of exposure to certain job-related hazards, particularly UHF irradiation [19] and which represents an "endogenization" of an exogenous process. Any environmental impact [1], including job-related factors, leads to changes in brain function, and are primarily exerted through the nonspecific formations. Reduced CNS function, in turn, leads to a situation where various effects (both somatogenic and psychogenic) on the brain that are easily tolerated under normal conditions, and result in the emergence of neuropsychic disturbances, the so-called secondary neuroses [24]. This hypothesis is also in need of further elaboration in the area of job-related psychiatry.

Finally, there is one more area in the study of neurosis-type conditions resulting from job-related factors that requires further elaboration and modification. That area is concerned with the fact that CNS function depends not only on the nerve impulses that emanate from the external and internal environment and the interaction between specific and non-specific brain structures, but also on blood supply and metabolism within the

neurons themselves. There is considerable interest in that regard in research on cerebral hemodynamics during exposure to various job-related factors (chemical, physical, sensory isolation conditions, and hypokinesia) which reveal abnormal cerebral blood supply [3, 15, 16]. This information enables us to understand that organic brain pathology stems from functional neuropsychic disturbances. The speed with which the process proceeds from the functional state to organic brain damage depends not only on the parameters of the job-related factors, but also on the degree of change in cerebral blood supply.

The prevention of borderline neuropsychic disturbances that result from job-related factors must be based on a number of medical and social-hygienic measures [8]. The prevalence of neuropsychic disturbances in persons exposed to job-related factors must not be judged merely by evidence of temporary disability. Even mass periodic preventive examinations cannot demonstrate the true extent of neurotic disturbances because of the lack of a goal-oriented psychopathological examination. In order to eliminate these difficulties, we recommend screening studies that are followed by clinical-psychopathological examinations of persons in the risk group. This might be one possible way for the early identification of not only the clinically described stage of an illness, but also the preclinical stage of disturbances which would make it possible to undertake timely preventive measures.

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CSO: 1840/068

UDC 616.98:518.835.26

EFFECT OF Ca-NA PREPARATION ON VIRAL INFECTION OF PIGLETS

Yerevan DOKLADY AKADEMII NAUK ARMYANSKOY SSR in Russian Vol 80, No 4, 1985  
pp 185-187

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[Abstract] One of the principal problems in prophylaxis and therapy of viral diseases (rabies, tick encephalitis, Venezuelan equine encephalitis) is the fact that many of these vaccinated animals become sick, usually because of weak immunogenicity or nonspecificity of the vaccines leading to inadequate immunity of vaccinated animals. Immunomodulation functions of exogenous nucleic acids were demonstrated (sodium nucleates of the RNA), leading to an immunoadjuvant effect in stimulation of the immune response in formation of antibodies and in creation of adequate immunity. An attempt was made to protect animals from viral infections by vaccination with weak immunogens coupled with some of these nucleic acids to create an adjuvant effect and to increase nonspecific resistance of the test animals towards viral infections, using Ca-nucleic acid (CaNA). The results showed that a single administration of CaNA, alone or in combination with another vaccine, protected the animals from viral infections, while the vaccine alone actually led to higher mortality. The CaNA preparation did not show any effect on weight gain of healthy animals or animals which survived the disease. It was concluded that CaNA increased the nonspecific resistance of the pig to viral infection. Figures 1; references 10: 7 Russian, 3 Western.  
[092-7813/13046]

PRINCIPLES OF SELECTIVE INACTIVATION OF VIRAL GENOME. III. KINETICS OF BACTERIOPHAGE MS2 INFECTIVITY INACTIVATION BY  $\beta$ -PROPIOLACTONE

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 19, No 4, Jul-Aug 85  
(manuscript received 30 May 84) pp 1139-1147

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[Abstract] Irreversible inactivation of the infectivity of viral suspension to a given level with preservation of immunogenicity represents one of the more important stages in preparation of dead antiviral vaccines.

$\beta$ -Propiolactone (PL) is often used to inactivate viral suspensions. In this work it was shown that, although the survival curve of MS2 phage under the action of PL deviated from the exponential curve, the inactivation kinetics could be accurately described when initial concentration of the agents was taken under consideration, the rate of its consumption in the reaction mixture and the inactivation rate constant for a given virus under the action of PL. The formulae were developed for accurate description of the inactivation of viral infectivity by addition of chemicals, and they made it possible to develop rational preparation of killed antiviral vaccines--inactivation of the viral infectivity to a given level by the action of chemical agents. Figures 3; references: 23 (Western, 1 by a Russian author).

[126-7813/13046]

## CONFERENCES

### BRIEFS

INFECTIOUS DISEASES SPECIALISTS CONFERENCE--(UzTAG)--The Second All-Union Conference of Specialists in Infectious Diseases was held in Tashkent on 26 September. Delegates from all the union republics discussed a wide range of problems connected with the diagnosis, treatment, and prophylaxis of diseases and exchanged their experiences. Special attention was given to the accelerated introduction of scientific advances into practice, the search for effective means of fighting sickness, and the improvement of the operation of medical institutions. New regulations of the All-Union Society of Specialists in Infectious Diseases were considered at the conference. Selections of the new membership of the administration of the society were made. Corresponding Member of the USSR Academy of Medical Sciences V. N. Hikiforov was selected as its chairman. [Text] [Tashkent PRAVDA VOSTOKA in Russian 27 Sep 85 p 2] 12794/13046

TO IMPROVE TREATMENT METHODS--(UzTAG)--A combined Plenum of All-Union Scientific-Medical Societies of Physical Therapists and Resortologists, Neurologists, and Psychiatrists opened on 9 October in Tashkent. Its participants, scholars from all the union republics, Moscow, and Leningrad, are discussing problems related to diseases of the central nervous system, exchanging their accumulated experience, and becoming acquainted with the newest treatment methods. The development of a concrete program for the further cooperation of scientific-medical societies was planned at the Plenum. [Text] [Tashkent PRAVDA VOSTOKA in Russian 10 Oct 85 p 2] 12794/13046

CSO: 1840/140

4TH USSR-ITALY SYMPOSIUM: 'MACROMOLECULES IN CELL FUNCTION,' KIEV, JULY 1984

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 19, No 3, May-Jun 85 pp 854-858

GRECHKO, V. V. and TIMOFEYEVA, M. Ya.

[Abstract] The 4th USSR-Italy Symposium on Macromolecules in Cell Function was held in Kiev in July 1984 and was jointly sponsored by the USSR Academy of Sciences and the Ukrainian SSR Academy of Sciences. The basic purpose of this Symposium was to develop scientific contacts and gain familiarity with the research done in the other country, as was the case with previous bilateral symposia held between the USSR and USA, France, and the FRG. One of the initiators of such meetings has been Academician A. A. Bayev, secretary of the Department of Biochemistry, Biophysics and Chemistry of Physiologically-Active Compounds of the USSR Academy of Sciences. The scientific program included sessions on "Molecular Enzymology," "Protein Structure and Evolution," "Molecular Organization and Function of Membranes," "Protein Biosynthesis and Its Regulation," "Molecular Biology of the Gene," "Genetic Engineering," "Oncogenesis and Mutagenesis," and on "Structural Organization and Function of the Genome." At each such session members of leading Soviet research laboratories were active participants. These sessions were also complemented by 68 poster presentations, and the abstracts of the Symposium have been published by Naukova Dumka, Kiev. It is anticipated that the entire proceedings will also be published.  
[124-12172/13046]



MISCELLANEOUS

DIRECTOR OF MOSCOW FIRST AID INSTITUTE FIRED

Moscow SOVETSKAYA ROSSIYA in Russian 19 Oct 85 p 1

[Article by N. Trubilin, RSFSR minister of health: "'Quitrent from an Alien Pen'"]

[Text] At one of its sessions the collegium of the RSFSR Ministry of Health considered the article "Quitrent from an Alien Pen" published in SOVETSKAYA ROSSIYA on 13 July 1985, and "Inertia of Lack of Principle" published on 6 September 1985, and fully confirmed the facts cited in these articles.

The director of the Moscow City Scientific Research Institute of First Aid imeni N.V. Sklifosovskiy, comrade B.D. Komarov, grossly violated moral and ethical standards, abused his official position and systematically appropriated work done by colleagues, without even participating in this work.

Taking this into account, on 10 October 1985 the collegium of the RSFSR Ministry of Health adopted a decision to relieve comrade B.D. Komarov of his duties as director of the Moscow City Scientific Research Institute of First Aid imeni N.V. Sklifosovskiy.

The RSFSR Ministry of Health has severely reprimanded the deputy director for the scientific department, comrade A.P. Kuzmichev, for his poor control over the formulation of scientific publications. Chief of the Main Administration for Scientific Research Institutes and the Coordination of Scientific Research, comrade V.N. Shabalin, has been given the task of strengthening control over scientific publications, with the participation of the chiefs of scientific establishments, with regard to determining their specific contribution to published papers.

The directors of scientific research institutes and VUZ rectors have been assigned the task of taking the necessary steps to establish strict control over compliance with the legal and moral-and-ethical demands made of the authors of scientific papers, and also of eliminating instances of only pro forma leadership over scientific work.

The order issued by the RSFSR Ministry of Health has been assigned for special control.

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